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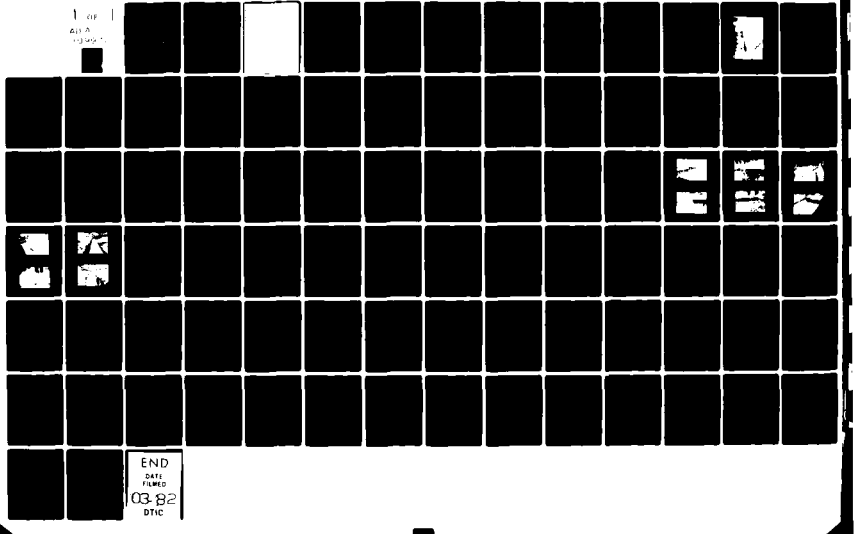

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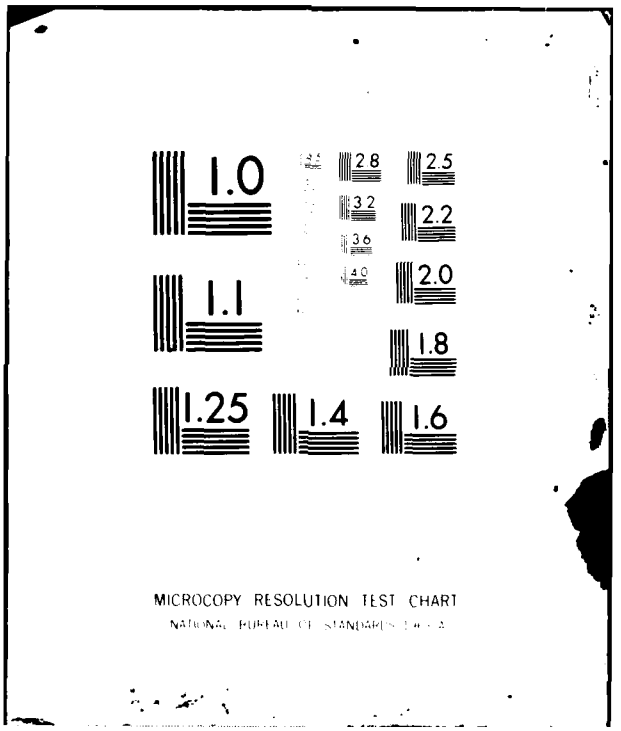
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SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE

READ INSTRUCTIONS BEFORE COMPLETING FORM

1. REPORT NUMBER

2. GOVT ACCESSION NO. LEVEL II AD A109971 (13)

3. RECIPIENT'S CATALOG NUMBER

4. TITLE (and Subtitle)
Phase I Inspection Report
Lake Mahopac Dam
Lower Hudson River Basin, Putnam County, NY
Inventory No. 1329

5. TYPE OF REPORT & PERIOD COVERED
Phase I Inspection Report
National Dam Safety Program

6. PERFORMING ORG. REPORT NUMBER

7. AUTHOR(s)
EUGENE O'Brien

8. CONTRACT OR GRANT NUMBER(s)
DACW51-81-C-0008

9. PERFORMING ORGANIZATION NAME AND ADDRESS
Tippetts-Abbett-McCarthy-Stratton
The TAMS Building
655 Third Avenue New York, New York 10017

10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS

11. CONTROLLING OFFICE NAME AND ADDRESS
Department of the Army
26 Federal Plaza New York District, CofE
New York, New York 10287

12. REPORT DATE
14 August 1981

13. NUMBER OF PAGES

14. MONITORING AGENCY NAME & ADDRESS(if different from Controlling Office)
Department of the Army
26 Federal Plaza New York District, CofE
New York, NY 10287

15. SECURITY CLASS. (of this report)
UNCLASSIFIED

15a. DECLASSIFICATION/DOWNGRADING SCHEDULE

16. DISTRIBUTION STATEMENT (of this Report)

Approved for public release; Distribution unlimited.

12 84

17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)

DTIC ELECTE JAN 5 1984 H

18. SUPPLEMENTARY NOTES

19. KEY WORDS (Continue on reverse side if necessary and identify by block number)
Dam Safety
National Dam Safety Program
Visual Inspection
Hydrology, Structural Stability
Lake Mahopac Dam
Putnam County
Lower Hudson River Basin

20. ABSTRACT (Continue on reverse side if necessary and identify by block number)

This report provides information and analysis on the physical condition of the dam as of the report date. Information and analysis are based on visual inspection of the dam by the performing organization.

The examination of documents and the visual inspection of Lake Mahopac Dam and its appurtenant structures did not reveal conditions which constitute an immediate hazard to human life and property.

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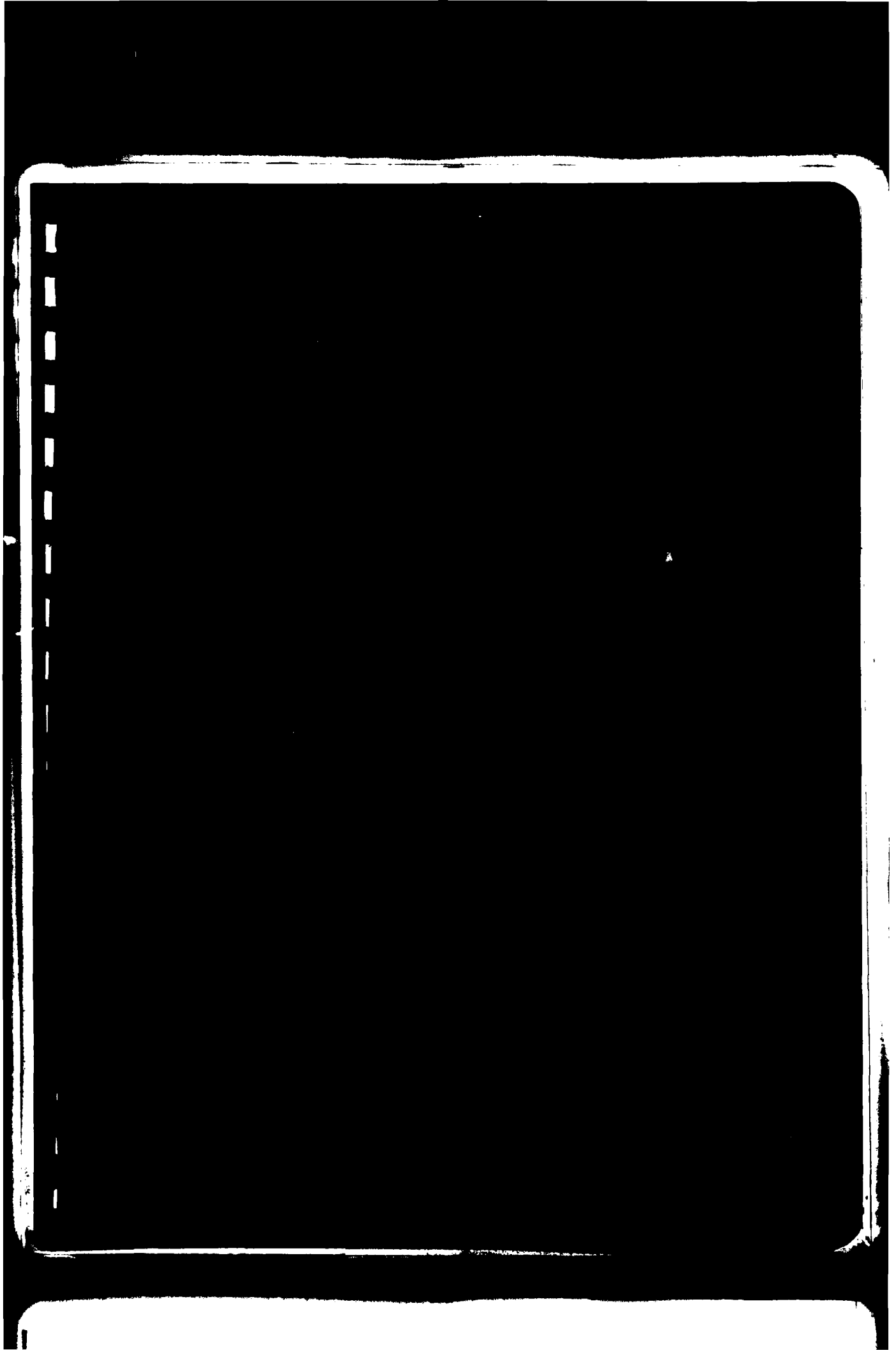
Using Corps of Engineers screening criteria, it has been determined that the dam would be overtopped for all storms exceeding approximately 56 percent of Probable Maximum Flood (PMF). The maximum spillway discharge capacity is 7.9 percent of the PMF peak outflow. The spillway is, therefore adjudged as "inadequate".



LOWER HUDSON RIVER BASIN

LAKE MAHOPAC DAM

PUTNAM COUNTY, NEW YORK
INVENTORY NO. N.Y. 1329

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NEW YORK DISTRICT CORPS OF ENGINEERS

SEPTEMBER 1981

PREFACE

This report is prepared under guidance contained in the Recommended Guidelines for Safety Inspection of Dams, for Phase I Investigations. Copies of these guidelines may be obtained from the Office of Chief of Engineers, Washington, D. C., 20314. The purpose of a Phase I Investigation is to identify expeditiously those dams which may pose hazards to human life or property. The assessment of the general condition of the dam is based upon available data and visual inspections. Detailed investigations, and analyses involving topographic mapping, subsurface investigations, testing, and detailed computational evaluations are beyond the scope of a Phase I Investigation; however, the investigation is intended to identify any need for such studies.

In reviewing this report, it should be realized that the reported condition of the dam is based on observations of field conditions at the time of inspection along with data available to the inspection team. In cases where the reservoir was lowered or drained prior to inspection, such action, while improving the stability and safety of the dam, removes the normal load on the structure and may obscure certain conditions which might otherwise be detectable if inspected under the normal operating environment of the structure.

It is important to note that the condition of a dam depends on numerous and constantly changing internal and external conditions, and is evolutionary in nature. It would be incorrect to assume that the present condition of the dam will continue to represent the condition of the dam at some point in the future. Only through frequent inspections can unsafe conditions be detected and only through continued care and maintenance can these conditions be prevented or corrected.

Phase I inspections are not intended to provide detailed hydrologic and hydraulic analyses. In accordance with the established Guidelines, the Spillway Test flood is based on the estimated "Probable Maximum Flood" for the region (greatest reasonably possible storm runoff), or fractions thereof. Because of the magnitude and rarity of such a storm event, a finding that a spillway will not pass the test flood should not be interpreted as necessarily posing a highly inadequate condition. The test flood provides a measure of relative spillway capacity and serves as an aid in determining the need for more detailed hydrologic and hydraulic studies, considering the size of the dam, its general condition and the downstream damage potential.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAKE MAHOPAC DAM
I.D. NO. N.Y. 1329
D.E.C. NO. 213D-4462
LOWER HUDSON RIVER BASIN
PUTNAM COUNTY, N.Y.

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PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM

NAME OF DAM:	Lake Mahopac Dam, N.Y. 1329
STATE LOCATED:	New York
COUNTY LOCATED:	Putnam
STREAM:	Tributary of Muscoot River
BASIN:	Lower Hudson River
DATE OF INSPECTION	6 May 1981

ASSESSMENT

The examination of documents and the visual inspection of Lake Mahopac Dam and its appurtenant structures did not reveal conditions which constitute an immediate hazard to human life and property.

Using Corps of Engineers screening criteria, it has been determined that the dam would be overtopped for all storms exceeding approximately 56 percent of Probable Maximum Flood (PMF). The maximum spillway discharge capacity is 7.9 percent of the PMF peak outflow. The spillway is, therefore adjudged as "inadequate".

The following remedial measures should be performed within 12 months from notification:

(1) Missing portions of the upstream stone masonry wall should be repaired.

(2) Brush and shrubbery should be removed from the embankment, spillway-reservoir drain structure and downstream channel. Provide a program of periodic cutting and or mowing of the dam surfaces, spillway-reservoir drain structure and the downstream channel.

next page

(3) The collected debris at the spillway-reservoir drain structure and in the downstream channel should be removed and hauled away from the dam.

(4) A program of periodic inspections and maintenance of the dam and appurtenances should be provided, including yearly operation and lubrication of the reservoir drain and its control facilities. This information should be documented for future reference.

(5) An emergency action plan for the project should be developed.

Eugene O'Brien, P.E.
New York No. 29823

Approved by:

Col. W. M. Smith, Jr.
New York District Engineer

Date: 14 Aug 81

1. OVERVIEW OF DAM.

PHASE I INSPECTION REPORT
NATIONAL DAM SAFETY PROGRAM
LAKE MAHOPAC DAM
I.D. NO. N.Y. 1329
D.E.C. NO. 213D-4462
LOWER HUDSON RIVER BASIN
PUTNAM COUNTY, N.Y.

SECTION 1 - PROJECT INFORMATION

1.1 GENERAL

a. Authority

The Phase I inspection reported herein was authorized by the Department of the Army, New York District, Corps of Engineers by Contract No. DACW 51-81-C-0008 dated 14 December 1980 in fulfillment of the requirements of the National Dam Inspection Act, Public Law 92-367, 8 August 1972.

b. Purpose of Inspection

The inspection was conducted to evaluate the existing conditions of the dam, to identify deficiencies and hazardous conditions, to determine if these deficiencies constitute hazards to life and property, and to recommend remedial measures where required.

1.2 DESCRIPTION OF THE PROJECT

a. Description of Dam and Appurtenant Structures

Lake Mahopac Dam consists of an earth embankment about 190 feet long and has a maximum height of about 9 feet. The width of the crest varies from 25 feet to 50 feet. The visible portion of the upstream face of the embankment is vertical and is retained by a 2 foot wide stone masonry wall. The downstream slope of the embankment, to the right of a spillway-reservoir drain structure, is vertical and protected by a 2 foot wide stone masonry wall; to the left of the spillway-reservoir drain structure it is 1 vertical to 4 horizontal near the crest and vertically retained by one of the stone masonry walls of the spillway-reservoir drain downstream channel.

A stone masonry/concrete structure, which serves as a spillway and a reservoir drain is located about 25 feet from the right abutment. The crest of the spillway is about 3 feet from the top of the dam and is 8 feet wide. Two foot wide stone masonry approach and downstream training walls flank the structure.

The reservoir drain is located at the bottom of the structure. The discharge through the reservoir drain is controlled by a sluice gate which can be operated from the top of the structure. The gate is about 12 feet downstream from the spillway crest. The discharges over the crest and through the reservoir drain flow over a sloping concrete apron, then into the downstream channel. The downstream channel is stone masonry lined, about 5 feet wide and 6 feet high. The channel invert forms the toe of the embankment. Its alignment makes a 120^{o} bend about 100 feet from the spillway-reservoir drain structure; continues along Peeksville Road for 1500 feet where it joins the downstream channel of Kirk Lake.

b. Location

The dam is located on a tributary of Muscoot River and Hudson River; approximately 800 feet from the intersection of Peeksville Road and West Lake Blvd. in the Village of Mahopac Falls.

c. Size Classification

The dam is about 9 feet high and impounds approximately 1300 acre-feet. Therefore, the dam is in the "intermediate" size category (between 1000 acre-feet and 50,000 acre-feet).

d. Hazard Classification

The dam is classified as high hazard due to several homes, a highway and commercial properties located 0.25 miles downstream from the dam.

e. Ownership

Lake Mahopac is owned by the Town of Carmel. The person to contact is Town Supervisor, Town Hall, Town of Carmel, McAlpin Avenue, Mahopac, New York, 10541, Telephone No. (914) 628-1470. At present the town supervisor is Mr. Dean Barrett. The maintenance of the dam is the responsibility of the Highway Department of the Town.

f. Purpose of Dam

The impoundment provided by the dam is mainly for recreation. The lake also supplies water to developments around the lake.

g. Design and Construction History

Original design and construction records are not available. It is reported that the dam was designed and constructed in 1940. The names of the designer and the contractor are unknown.

h. Normal Operating Procedures

There are no normal operating procedures. Lake level is maintained at the spillway crest in spring and summer. In fall the lake level is lowered by 1 to 1.5 feet to allow maintenance of docks and prevent damage to docks due to ice in winter.

1.3 PERTINENT DATA

a. Drainage Area, Square Miles	2.7
b. Discharge at Damsite, cfs	
Ungated spillway capacity at El 660	108.8
c. Elevation (Feet above MSL)	
Top of Dam	660.00
Spillway Crest	657.00
Reservoir Drain (at Sluice Gate)	653.7
d. Reservoir	
Length of Normal Pool (Miles)	0.8
Surface Area at El 657 (Acres)	608
Surface Area at El 660 (Acres)	625
e. Storage (Acre-Feet)	
Top of Spillway Crest (El 657)	1300
Top of Dam (El 660.0)	3080
f. Dam	
Type	Earth Embankment
Length (Feet)	190
Height (Feet)	9
Crest Width (Feet)	Varies from 25 to 50 feet
Side Slopes:	
Upstream	Vertical, Stone masonry wall
Downstream, Right of Spillway-Reservoir Drain Structure	Vertical, Stone masonry wall
Downstream, Left of Spillway-Reservoir Drain Structure	1(V):4(H) and vertical stone masonry wall
g. Spillway	
Type	Sharp-crested, Stone Masonry-concrete
Length	8 ft
Crest Elevation	657.0
h. Reservoir Drain	
Type	15-inch diameter sluice way
Elevation (Invert)	Intake 653.7

SECTION 2 - ENGINEERING DATA

2.1 GEOLOGY

The records of the owner contain no data on site geology. However, there is data available in the literature on the general geology of the area. Mahopac Lake Dam is located in the Hudson Highlands section of the New England Uplands physiographic province. The province is characterized by a low, but rugged mountain range consisting primarily of igneous and metamorphic rock. The rock underlying the area of the dam is Precambrian biotite-quartz-plagioclase paragneiss with subordinate biotite granitic gneiss, amphibolite and calcilicate rock.

2.2 SUBSURFACE INVESTIGATIONS

There are no records of subsurface investigations available. It is known that the surficial soils in the vicinity of the dam and reservoir are coarse grained glacial till material.

2.3 DAM AND APPURTENANT STRUCTURES

There are no design data, construction drawings or design memoranda available for the project features.

2.4 CONSTRUCTION RECORDS

There are no records of the original construction of the dam available. The name(s) of the contractor is (are) unknown.

2.5 OPERATION RECORDS

There are no records of operation of the dam. The reservoir drain sluice gate is reportedly operated during fall to lower the lake level by 1 foot to 1.5 feet so that maintenance of the docks may be carried out and to prevent damage to the docks by ice. There is no formal operation and maintenance manual for the project. No records of reservoir levels and rainfall are kept.

2.6 EVALUATION DATA

Information was made available by the New York State Department of Environmental Conservation and the Town of Carmel, New York.

The information obtained from the available data, personal interviews and the visual inspection are considered adequate for this Phase I inspection and evaluation.

SECTION 3 - VISUAL OBSERVATION

3.1 FINDINGS

a. General

The visual observation of the Mahopac Dam was made on 6 May 1981. The weather was sunny with the temperature ranging between 60 and 70° F. At the time of inspection, the reservoir level was about El 657.2, 2 inches above the crest of the spillway-reservoir drain structure. The reservoir drain was closed.

b. Dam

The dam, which consists of earth embankment appears to be in generally good condition. There are no visible signs of distress or movement. The horizontal and vertical alignment of the crest are also good.

The visible portion of the upstream slope which is protected by a vertical stone masonry wall, appears to be in good condition except in the vicinity of the left abutment, where about 50 feet of the wall is missing. There is minor vegetation growing through the wall joints particularly near the spillway.

The downstream slopes as well as the stone masonry wall of the channel appear to be in good condition except for minor vegetation such as bushes and overgrown grass. The slope does not exhibit any erosion, sloughing or signs of trespassing. There are no signs of seepage at the downstream toe.

c. Spillway-Reservoir Drain

The spillway and reservoir drain which are located about 25 feet from the left abutment are part of a stone masonry-concrete structure. The exposed spillway portion of the structure and the downstream concrete apron appear to be in good condition except for debris collected at and inside the structure.

The reservoir drain and the control are in operating condition.

A detailed sketch showing the configuration of the spillway-reservoir drain structure as was determined from field measurements is given in Plates 4 and 5.

d. Abutments

There are no signs of seepage or other unusual conditions at both abutments.

e. Downstream Channel

The channel downstream of the spillway-reservoir drain structure is stone masonry lined rectangular in section and appears to be in generally good condition except for minor vegetation growing through the joints and collected debris.

f. Reservoir Area

In the vicinity of the dam there is no evidence of sloughing, potentially unstable slopes or other unusual conditions which would adversely affect the dam. No evidence of excessive sedimentation was observed. The lake water was relatively clean.

3.2 EVALUATION OF OBSERVATIONS

Visual observations made during the course of the inspection did not reveal serious problems which would adversely affect the adequacy of the dam and the appurtenant facilities. The following summarizes the encountered problem areas, in order of importance with the recommended remedial action:

1. The missing portion of the upstream stone masonry wall should be repaired.

2. The brush and shrubs should be removed from the embankment, spillway-reservoir drain structure and downstream channel. A program of periodic cutting and or mowing of the dam surfaces, spillway-reservoir drain structure and the downstream channel should be provided.

3. The collected debris at the spillway-reservoir drain structure and in the downstream channel should be removed and hauled away from the dam.

4. An emergency action plan for the project should be developed.

SECTION 4 - OPERATION AND MAINTENANCE PROCEDURES

4.1 PROCEDURES

There are no operating procedures for regulating the discharges. The reservoir drain sluice gate is kept closed during the spring and summer so that the lake level is maintained at the spillway crest. In fall the lake level is maintained 1 to 1.5 feet below the spillway crest by discharging through the reservoir drain (gates kept open). It is reported that lowering the lake is done to allow for dock maintenance and to prevent ice damage to docks in the winter.

4.2 MAINTENANCE OF THE DAM

There is no operating and maintenance manual for the dam. There is no regular maintenance done at the dam, but is done as needed. The presence of the debris in the spillway and discharge channel, overgrown bushes and shrubs and trees is considered unacceptable.

4.3 MAINTENANCE OF OPERATING EQUIPMENT

There is no regular maintenance of the sluice gate of the reservoir drain. During the inspection the sluice gate was operated and appears to be in good condition except for minor rusting of the stem. The operating mechanism for the gate is kept at the Highway Department, Town of Carmel.

4.4 WARNING SYSTEM IN EFFECT

There is no warning system in effect or in preparation.

4.5 EVALUATION

The operation and maintenance of Lake Mahopac Dam is considered inadequate in the following areas:

1. Maintenance of the upstream stone masonry wall.

2. Control of vegetation on the embankment and in the spillway-reservoir drain structure and its channel.

3. Debris in and at the spillway-reservoir drain structure.

SECTION 5 - HYDROLOGIC/HYDRAULIC

5.1 DRAINAGE AREA CHARACTERISTICS

Lake Mahopac is located in Carmel Township, Putnam County, New York (Hydrologic Unit Code No. 02030101), and is the headwater of the Muscoot River, with a drainage area of 2.7 square miles. The lake surface area at elevation 657 is 0.95 square miles or 35 percent of the drainage area. The basin consists of a northern sub-area of 0.94 square miles, relatively undeveloped with some surface storage in Wixon Pond and a small wet-land area. The urbanized southern sub-area has little storage in its 0.83 square miles and no defined river channels. The basin is extremely narrow on the eastern and western sides of the lake.

5.2 ANALYSIS CRITERIA

The analysis of the adequacy of the spillway was performed by developing a design flood using the unit hydrograph method and the Probable Maximum Precipitation (PMP). The all season 200 square mile 24 hour PMP for the Lake Mahopac basin of 22 inches was obtained from Hydro-meteorological Report No. 33, and distributed according to Standard Project Flood Determination, EM 1110-2-1411, Army Corps of Engineers.

The unit hydrograph for each sub-area was computed using Snyder's method with coefficients of 2 and 0.625 for C_T and C_P, respectively. Rainfall loss parameters of 1.0 inch initial loss and 0.1 inch per hour constant loss were selected as representative for the PMP event. In accordance with the recommended guidelines for Safety Inspection of Dams, the adequacy of the spillway was analyzed using the Probable Maximum Flood (PMF). A multi-plan analysis was performed for 50%, 75% and 100% PMF.

5.3 SPILLWAY CAPACITY

The maximum discharge of the unconventional structured spillway, was computed to be 108.8 cfs with the lake surface at El 660, and the sluice gate closed. A low coefficient of discharge was selected in order to represent the obstruction to flow caused by the structure built in the spillway channel.

5.4 RESERVOIR CAPACITY

The normal capacity of the reservoir is listed as 1300 acre-feet. The computed surcharge storage between spillway crest (El 657) and the top of the dam (El 660) is 1780 acre-feet, which is equivalent to approximately 12.4 inches of runoff over the entire drainage area.

5.5 FLOODS OF RECORD

There are no records of floods or maximum reservoir elevations at the dam.

5.6 OVERTOPPING POTENTIAL

The potential of the dam being overtopped was investigated on the basis of the spillway discharge capacity and the available surcharge storage to meet the selected design flood inflows.

The HEC-1DB analysis was performed assuming that the water surface of the lake was at spillway crest elevation at the start of the flood event. The basin was divided into two sub-areas and the combined hydrographs routed through the lake.

The results of the multi-ratio analysis are as follows:

RATIO OF PMF	PEAK INFLOW	PEAK OUTFLOW	OVERTOPPING
1.00	7797 cfs	1372 cfs	1.57 ft.
0.75	5848 cfs	540 cfs	0.74 ft.
0.50	3899 cfs	99 cfs	0.00 ft.

The dam would be overtopped by all floods exceeding 56 percent of the PMF. The maximum spillway discharge capacity is 7.9 percent of the peak PMF outflow.

5.7 EVALUATION

The dam does not have sufficient capacity to pass PMF, however, it has capacity to pass one-half PMF. Using the Corps of Engineers screening criteria, the spillway is therefore assessed as being "inadequate".

SECTION 6 - STRUCTURAL STABILITY

6.1 EVALUATION OF STRUCTURAL STABILITY

a. Visual Observation

Visual observations did not indicate either existing or potential problems with the dam and spillway-reservoir drain structure. The observed missing wall at the upstream face is not detrimental to the dam's stability or safety at the present time, however, condition should be repaired before it worsens.

b. Design and Construction Data

There exists no design computations or other data regarding the structural stability of the dam or spillway-reservoir drain structure.

c. Operating Records

There are no available records of the reservoir elevations and gate operations. No major operational problems which would affect the stability of the dam were reported.

d. Post Construction Changes

There are no records of post construction changes available.

e. Seismic Stability

According to the recommended Corps of Engineers guidelines, the dam is located in Seismic Zone No. 1. However, based on past earthquake history the New York State Geological Survey considers the site to be in Zone 2. Based on this assessment the dam is considered in the Seismic Zone 2.

6.2 STRUCTURAL STABILITY ANALYSIS

Analyses to determine the stability of the spillway-reservoir drain structure to withstand sliding or overturning were not performed. Considering the relatively small external loadings acting upon the relatively large, heavy concrete structure, it has been concluded on engineering judgment that the stability criteria (overturning and sliding) as set forth by U.S. Army Engineering Regulations ER 1110-2-106 Appendix B, will be met for all required loading cases.

SECTION 7 - ASSESSMENT/RECOMMENDATIONS

7.1 ASSESSMENT

a. Safety

Examination of the available documents and the visual inspection of Lake Mahopac Dam did not reveal any conditions which constitute an immediate hazard to life or property.

Using the Corps of Engineers screening criteria for examination of spillway adequacy, it has been determined that the dam would be overtopped for all storms exceeding approximately 56 percent of Probable Maximum Flood (PMF). The maximum spillway discharge capacity is 7.9 percent of the PMF peak outflow. The spillway is, therefore adjudged as "inadequate".

b. Adequacy of Information

This report and its conclusions are based on the visual inspection, interviews and hydrologic/hydraulic studies. This information and data are adequate for a Phase I inspection.

c. Need for Additional Information

No additional investigations are required for the project.

d. Urgency

All remedial actions described below should be completed within one year of notification to the owner.

7.2 RECOMMENDED MEASURES

The recommended measures are as follows:

1. The missing portion of the upstream stone masonry wall should be repaired.

2. Brush and shrubs should be removed from the embankment, spillway-reservoir drain structure and downstream channel. A program of periodic cutting and or mowing of the dam surfaces, spillway-reservoir drain structure and the downstream channel should be provided.

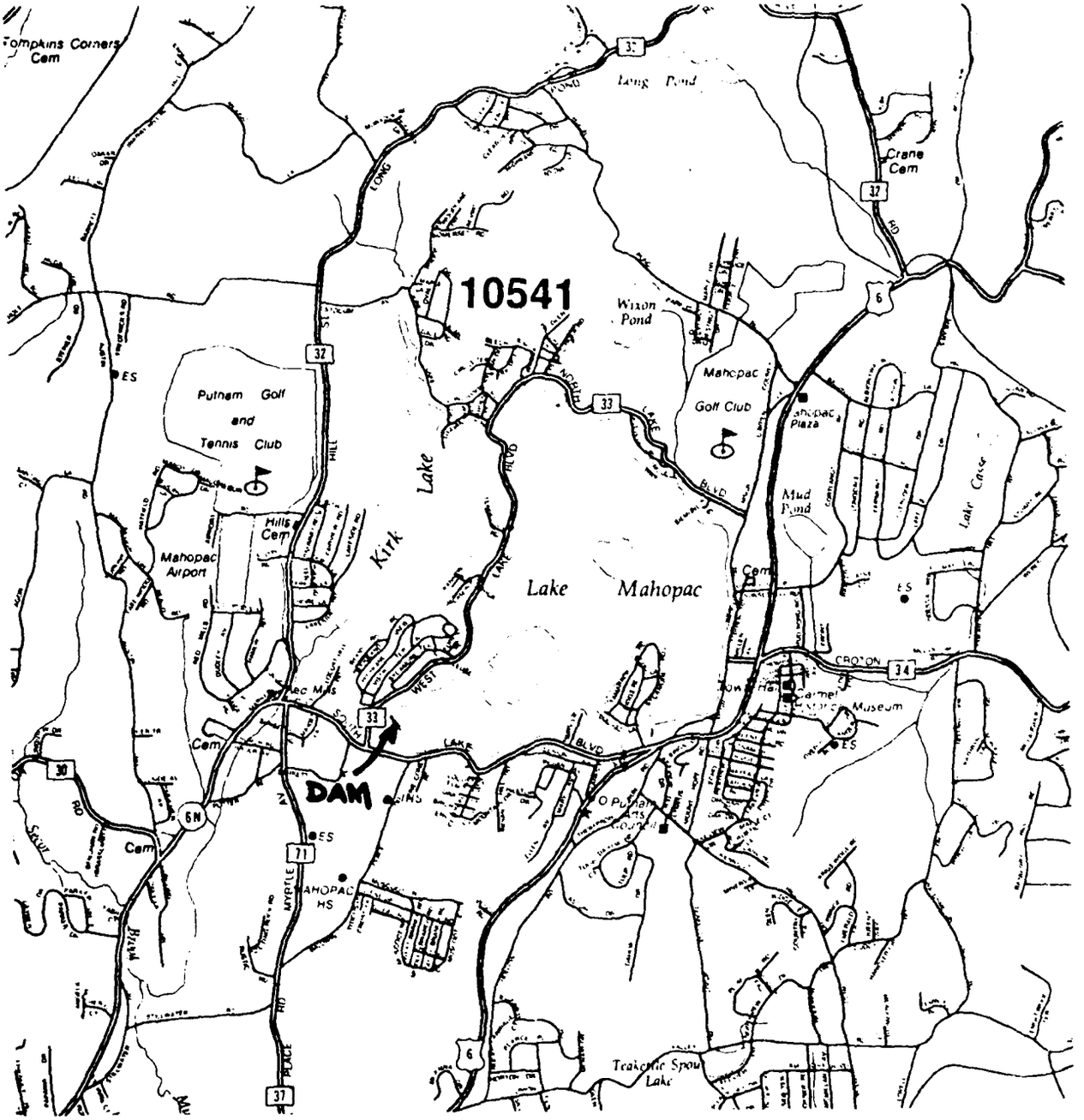
3. The collected debris at the spillway-reservoir drain structure and in the downstream channel should be removed and hauled away from the dam.

4. A program of periodic inspections and maintenance of the dam and appurtenances including yearly operation and lubrication of the reservoir drain and its control facilities should be provided. This information should be documented for future reference.

5. An emergency action plan for the project should be developed.

DRAWINGS

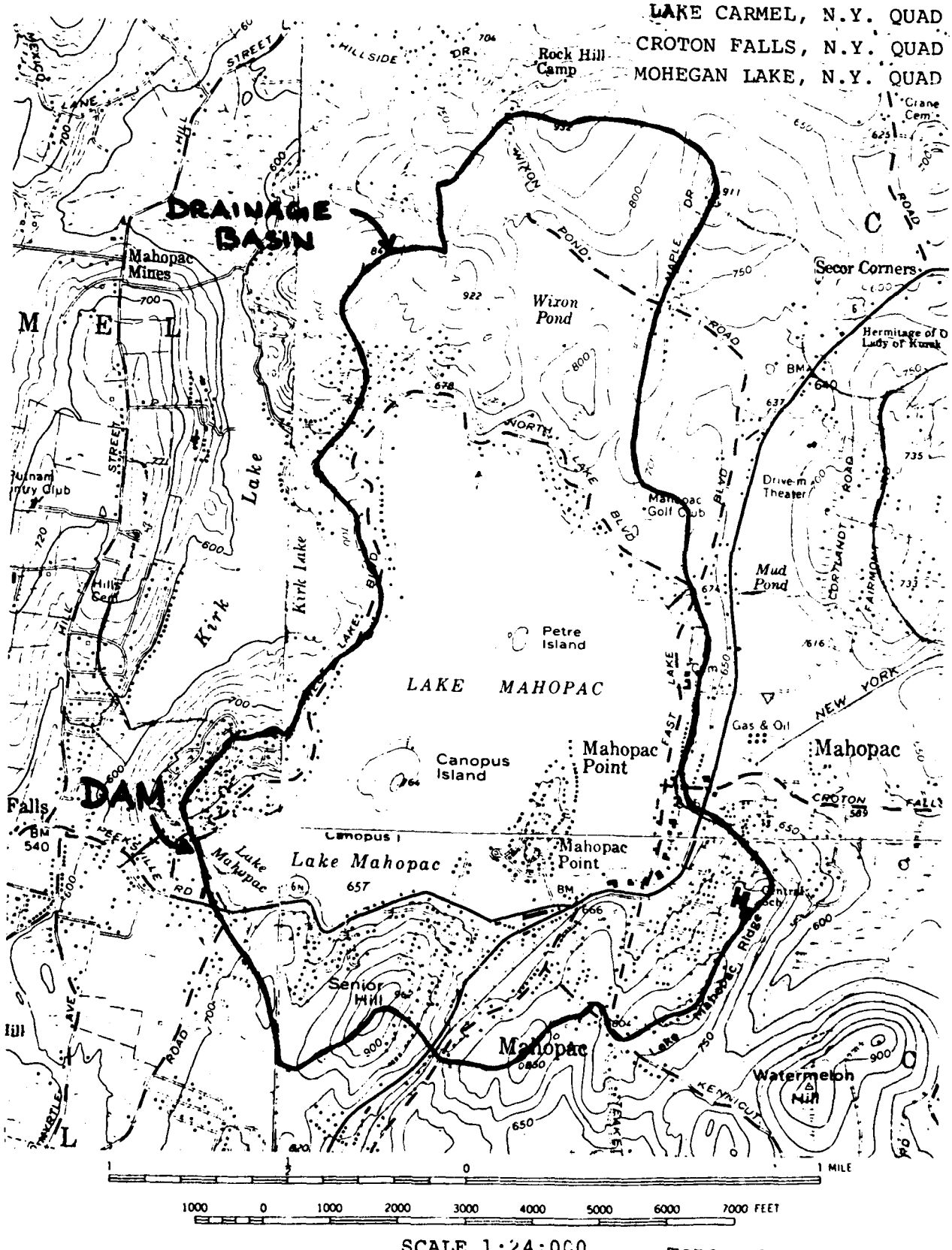
APPENDIX A



VICINITY MAP
LAKE MAHOPAC DAM

PLATE NO. 1

OSCAWANA LAKE, N.Y. QUAD
LAKE CARMEL, N.Y. QUAD
CROTON FALLS, N.Y. QUAD
MOHEGAN LAKE, N.Y. QUAD



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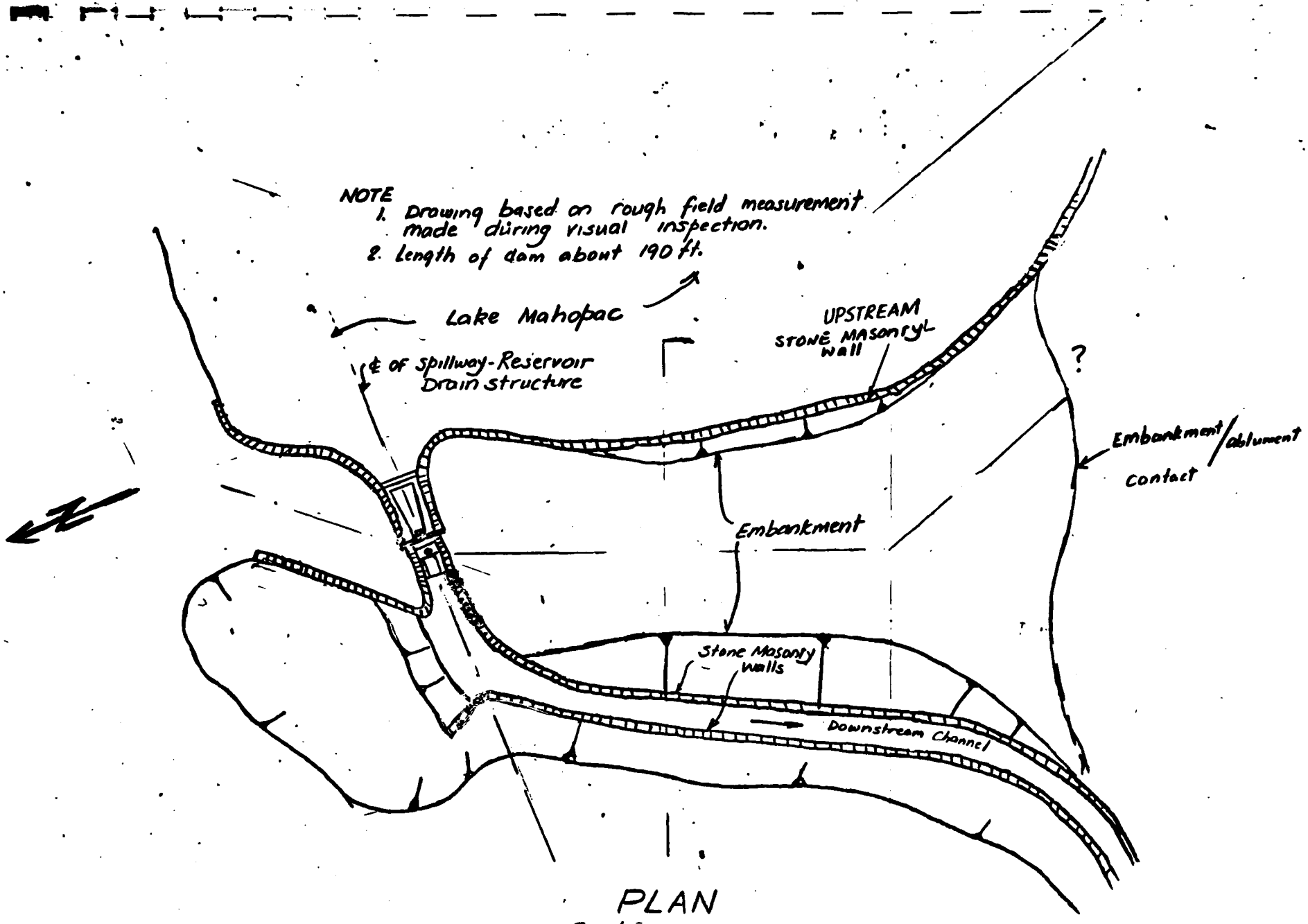
TOPOGRAPHIC MAP
LAKE MAHOPAC DAM

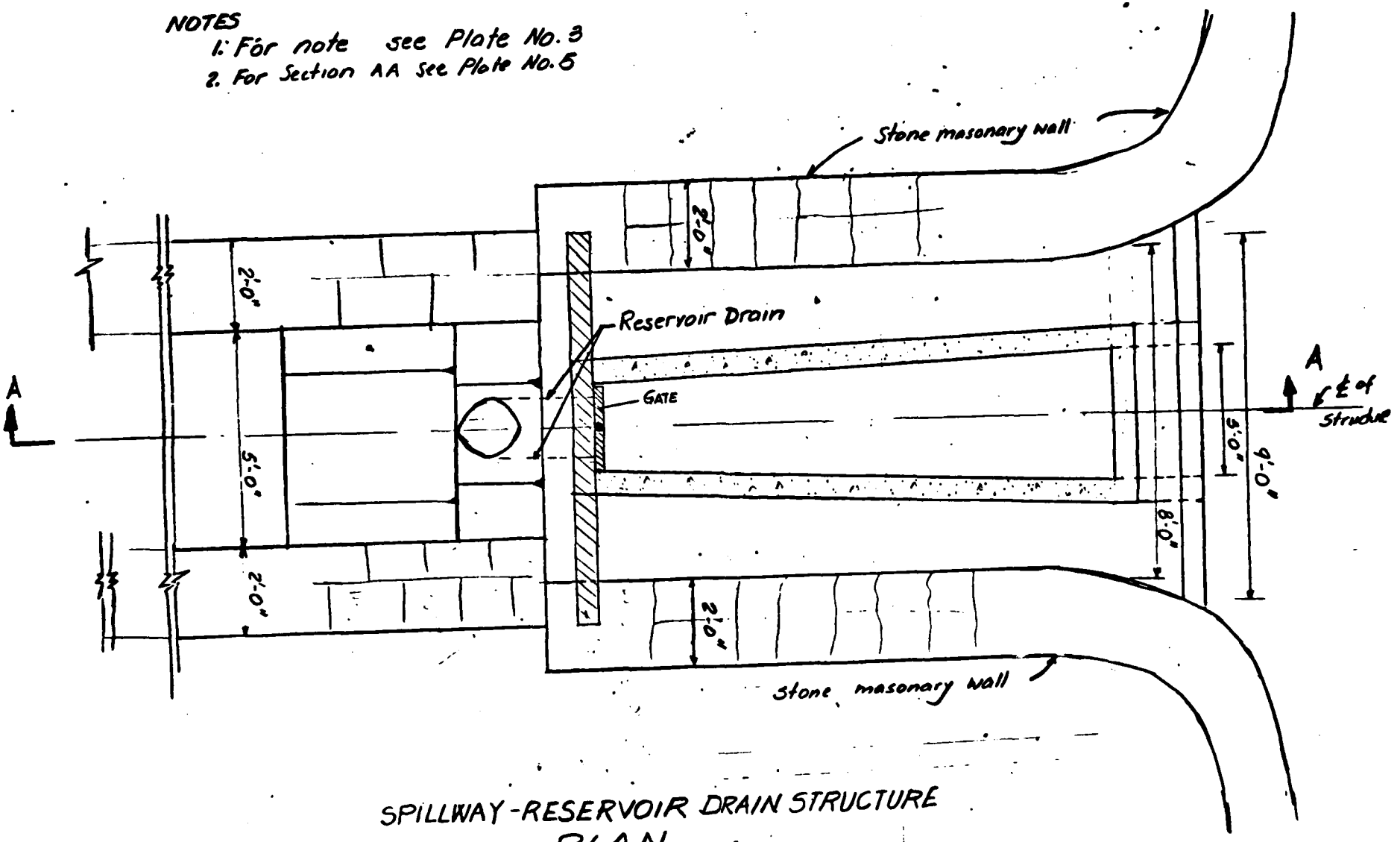
PLATE NO. 2



PLAN
Scale: NTS

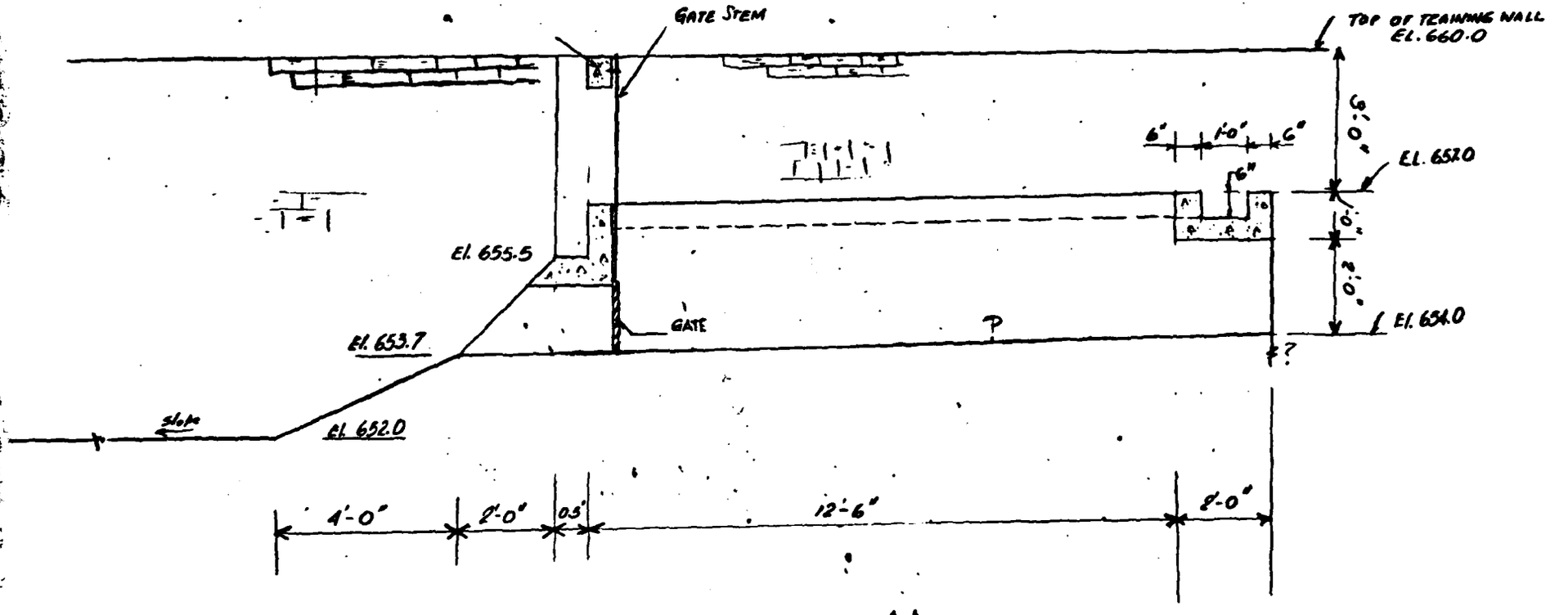
PLATE NO. 3.

NOTES
1. For note see Plate No. 3
2. For Section AA see Plate No. 6



SPILLWAY - RESERVOIR DRAIN STRUCTURE
PLAN
SCALE: NTS

Plate No 4



SECTION AA
SCALE: NTS

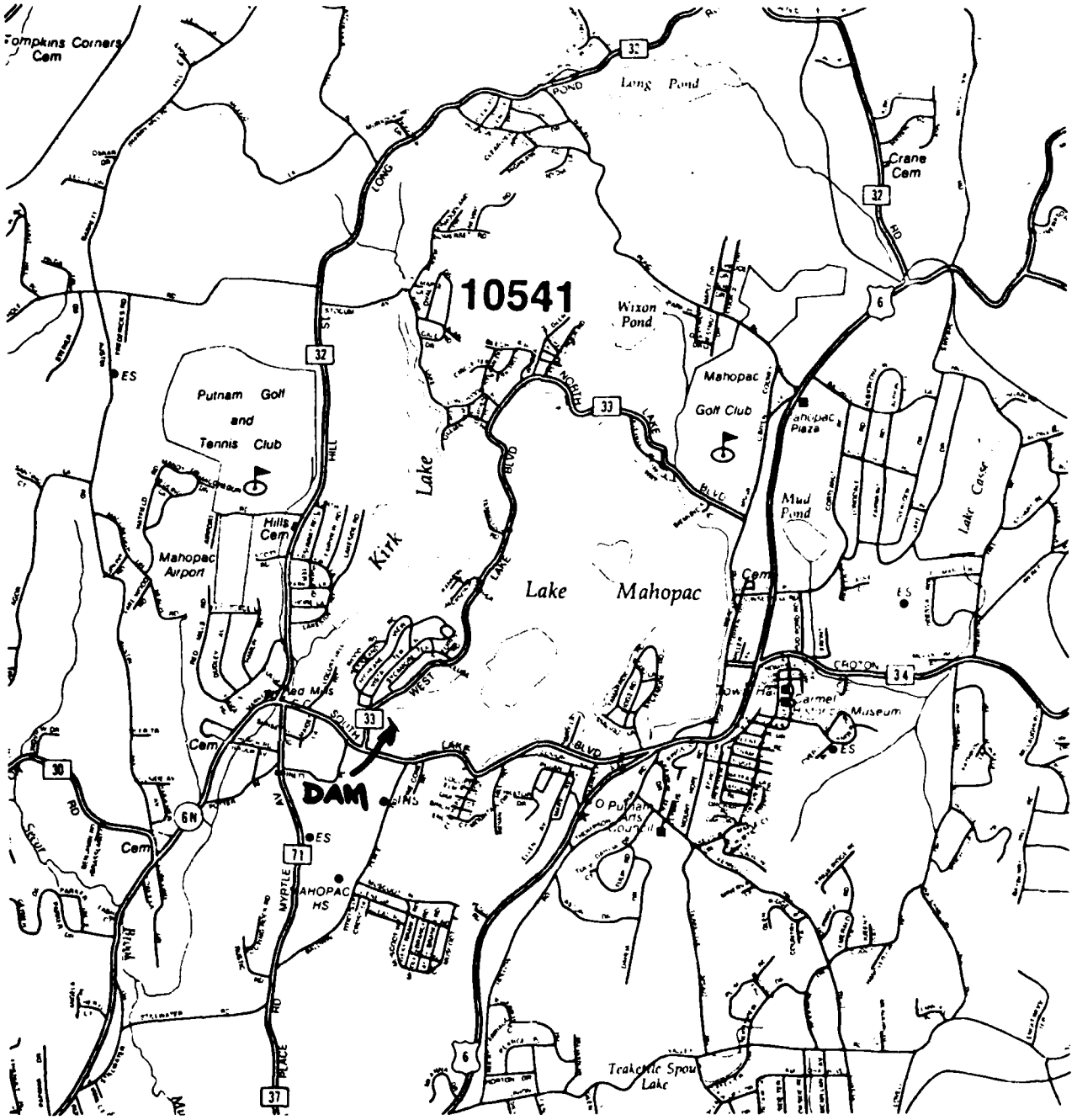
Plate No. 5

PHOTOGRAPHS

APPENDIX B

DRAWINGS

APPENDIX A



VICINITY MAP
LAKE MAHOPAC DAM

PLATE NO. 1

OSCAWANA LAKE. N.Y. QUAD
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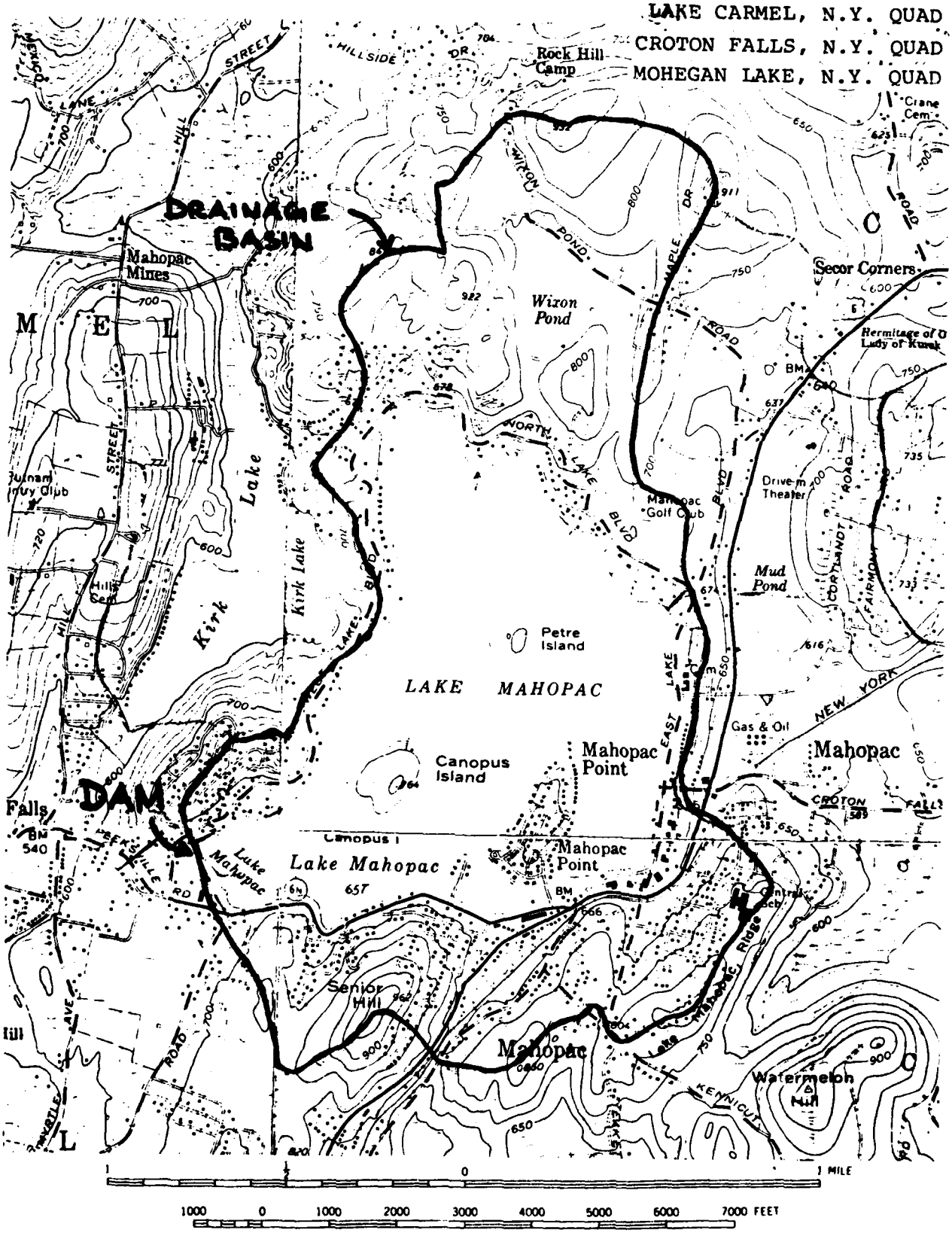
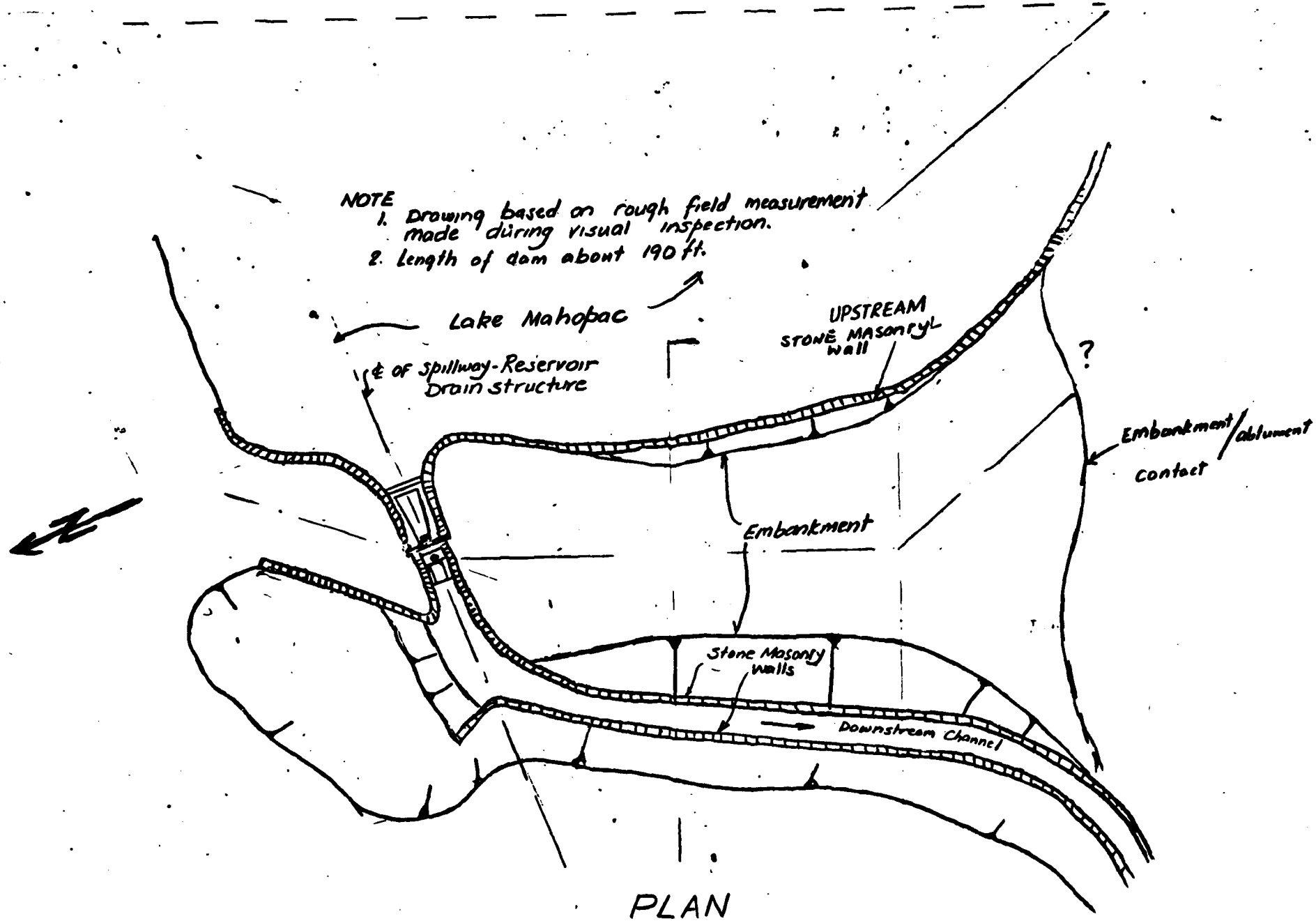
CROTON FALLS, N.Y. QUAD
MOHEGAN LAKE, N.Y. QUAD



SCALE 1:24:000

TOPOGRAPHIC MAP
LAKE MAHOPAC DAM

PLATE NO. 2

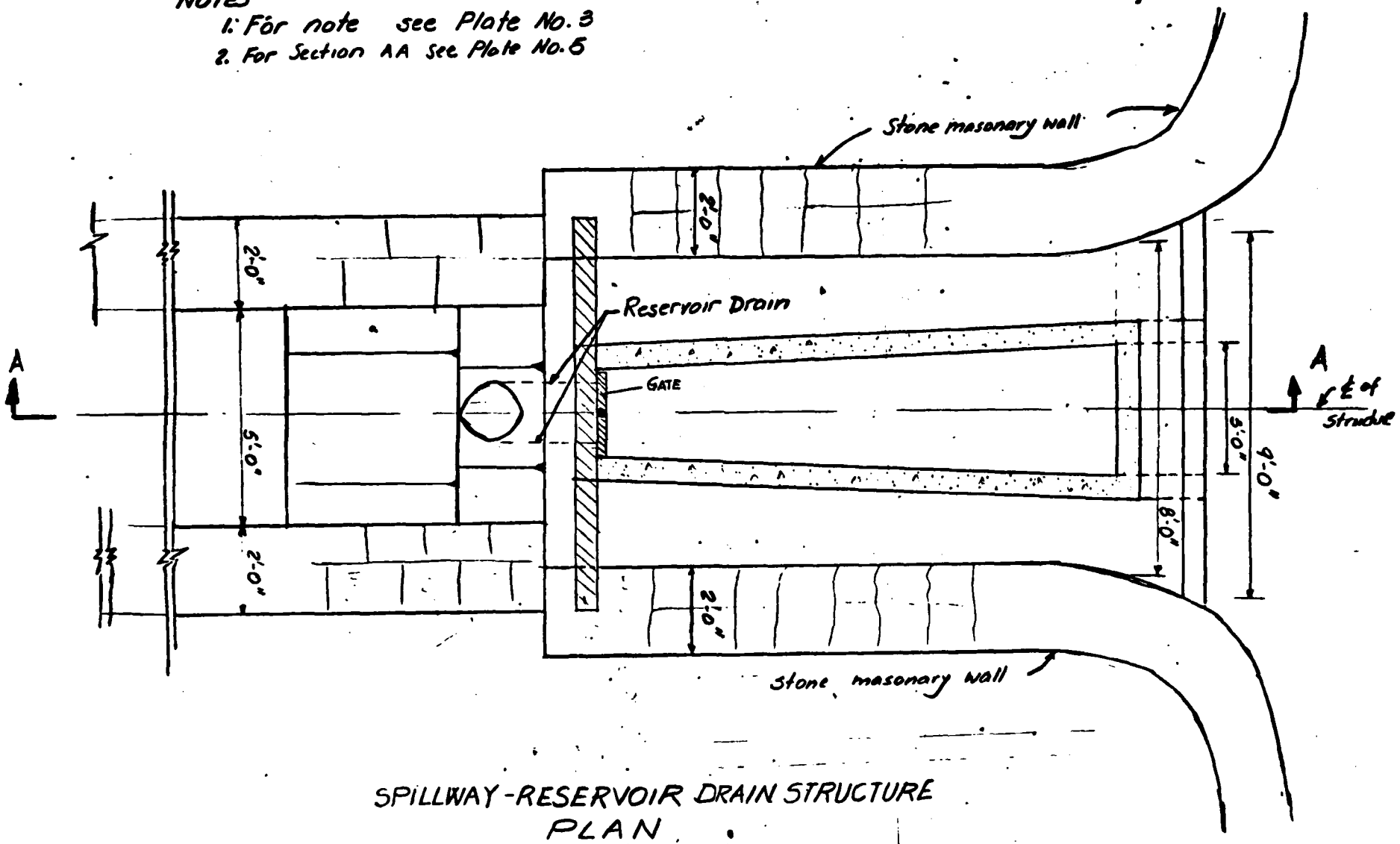


PLAN
Scale: NTS

PLATE NO. 3.

NOTES

1. For note see Plate No. 3
2. For Section AA see Plate No. 5

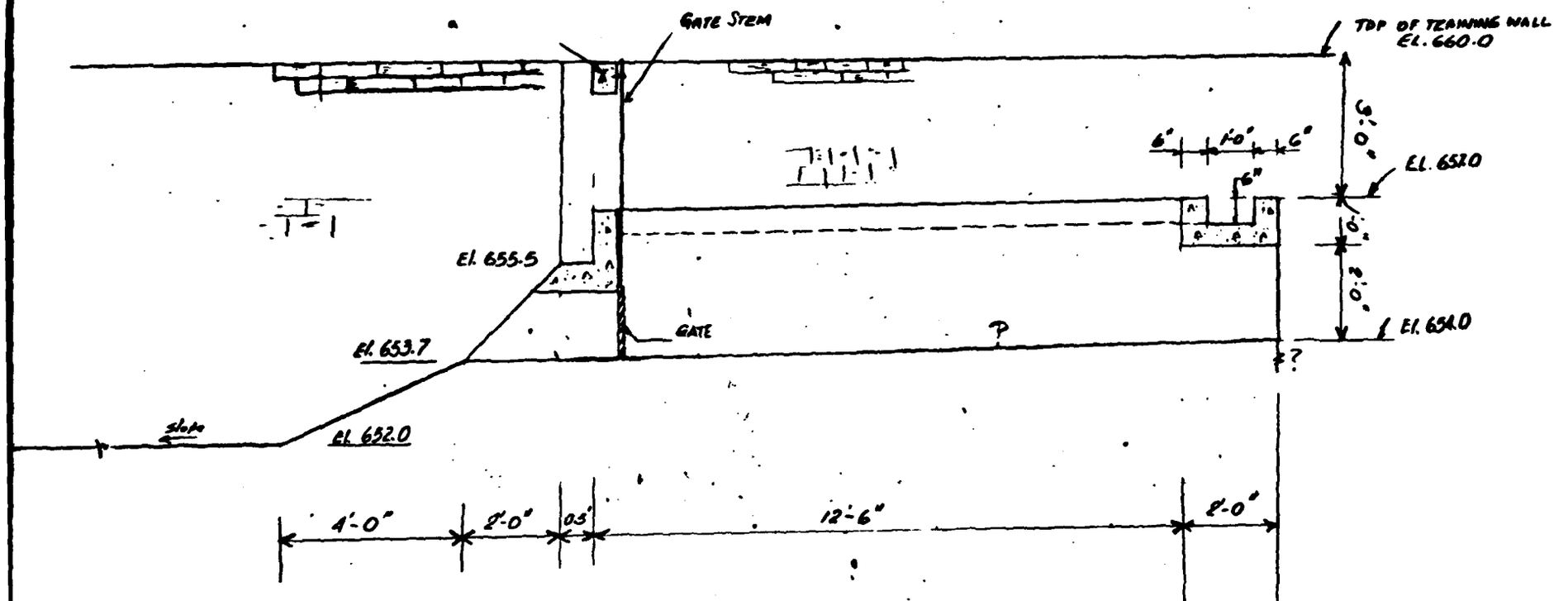


SPILLWAY - RESERVOIR DRAIN STRUCTURE

PLAN

SCALE: NTS

Plate No 4



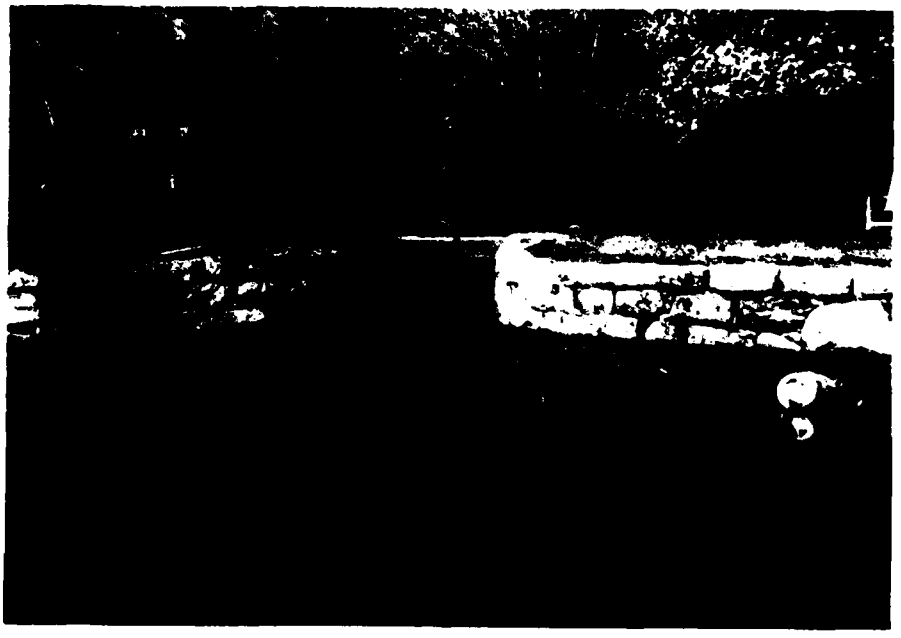
SECTION AA
SCALE: NTS

Plate No. 5

PHOTOGRAPHS

APPENDIX B

2. UPSTREAM VIEW OF DAM. (NOTE: Floating Debris in Reservoir)



3. UPSTREAM VIEW AT SPILLWAY-RESERVOIR DRAIN STRUCTURE.

4. VIEW OF CREST FROM SPILLWAY-RESERVOIR DRAIN STRUCTURE LOOKING LEFT. (NOTE: Trees)

5. VIEW OF CREST LOOKING RIGHT. PHOTOGRAPH TAKEN ABOUT 70 FT FROM LEFT ABUTMENT/DAM CONTACT.

6. VIEW OF SPILLWAY-RESERVOIR DRAIN STRUCTURE SILL. (NOTE: Collected Debris)

7. VIEW OF SPILLWAY-RESERVOIR DRAIN STRUCTURE AT DRAIN OUTLET. (NOTE: Collected Debris)

8. VIEW OF DOWNSTREAM FACE OF SPILLWAY-RESERVOIR DRAIN STRUCTURE. (NOTE: Vegetation and Collected Debris)

9. VIEW OF UPSTREAM FACE. (NOTE: Upstream Stone Wall Condition)

10. VIEW OF DOWNSTREAM CHANNEL - LOOKING RIGHT.

11. VIEW OF DOWNSTREAM CHANNEL - LOOKING LEFT.

VISUAL INSPECTION CHECKLIST

APPENDIX C

VISUAL INSPECTION CHECKLIST

1 Basic Data

a. General

Name of Dam LAKE MAHOPAC

Fed. I.D. # N.Y. 1329 DEC Dam No. 213 D-4462

River Basin HUDSON RIVER BASIN

Location: Town MAHOPAC VILLAGE County PUTNAM

Stream Name MUSCOOT RIVER

Tributary of HUDSON RIVER

Latitude (N) 41° 22.5° Longitude (W) 73 ·45.3°

Type of Dam EARTH

Hazard Category HIGH (1)

Date(s) of Inspection MAY 6, 81

Weather Conditions Partly Cloudy; 60-70° F.

Reservoir Level at Time of Inspection El. 657.2

b. Inspection Personnel HARVEY FELDMAN & JYOTINDRA PATEL

c. Persons Contacted (Including Address & Phone No.)

MR. DEAN BARRETT, TOWN SUPERVISOR
TOWN HALL, TOWN OF CARMEL
McALPIN AV.
MAHOPAC NY 10541

d. History:

Date Constructed 1940* Date(s) Reconstructed —

* reported

Designer Unknown

Constructed By Unknown

Owner TOWN OF CARMEL (Address as above)

Embankment

a. Characteristics

(1) Embankment Material Earth fill; classification of earth fill unknown.

(2) Cutoff Type unknown

(3) Impervious Core unknown

(4) Internal Drainage System unknown

(5) Miscellaneous None

b. Crest

(1) Vertical Alignment Good

(2) Horizontal Alignment Good.

(3) Surface Cracks none observed

(4) Miscellaneous brushes and several large size trees; Several animal burrows

c. Upstream Slope

(1) Slope (Estimate) (V:H) VERTICAL - STONE WALL.

(2) Undesirable Growth or Debris, Animal Burrows

(3) Sloughing, Subsidence or Depressions Near left abutment about 30'ft of wall displaced and stones missing.

(4) Slope Protection — Stone wall

(5) Surface Cracks or Movement at Toe Unobservable - below water level

d. Downstream Slope

(1) Slope (Estimate - V:H) Varies from Vertical to 1(V):4(H)

(2) Undesirable Growth or Debris, Animal Burrows Overgrown grass, brushes and animal burrows

(3) Sloughing, Subsidence or Depressions None observed.

(4) Surface Cracks or Movement at Toe None Observed

(5) Seepage None observed

(6) External Drainage System (Ditches, Trenches; Blanket) None. however downstream spillway - low level outlet channel runs along the toe.

(7) Condition Around Outlet Structure

(8) Seepage Beyond Toe none observed.

e. Abutments - Embankment Contact

Both abutments - natural ground

(1) Erosion at Contact none observed

(2) Seepage Along Contact none observed.

3) Drainage System

a. Description of System Appears to be none

b. Condition of System —

c. Discharge from Drainage System —

) Instrumentation (Monumentation/Surveys, Observation Wells, Weirs, Piezometers, Etc.)

None

) Reservoir

a. Slopes Visible slopes in Vicinity of Dam are in generally stable condition.

b. Sedimentation

c. Unusual Conditions Which Affect Dam none observed

o) Area Downstream of Dam

a. Downstream Hazard (No. of Homes, Highways, etc.) Several homes, And Rt 6 downstream of Dam.

b. Seepage, Unusual Growth (a) None observed. (b) none except brushes and trees.

c. Evidence of Movement Beyond Toe of Dam none observed.

d. Condition of Downstream Channel see spillway channel (7d.)

) Spillway(s) (Including Discharge Conveyance Channel)

Spillway structure also has low level outlet.

a. General The spillway structure also shall low level outlet (reservoir drain). Because of discharge flowing in the spillway the layout and details of the low level outlet could not be determine.

b. Condition of Service Spillway Generally good except collected debris at and in spillway.

c. Condition of Auxiliary Spillway No Auxilary spillway

d. Condition of Discharge Conveyance Channel Discharge channel (stone lined) is also for reservoir drain is in good condition except some brush growing through stone masonary joints and debris.

) Reservoir Drain/Outlet *

Type: Pipe _____ Conduit _____ Other Circular hole in Concrete Structure

Material: Concrete ✓ Metal _____ Other _____

Size: 15" ** Length _____

Invert Elevations: Entrance _____ Exit _____

Physical Condition (Describe): Unobservable ✓ Under water

Material: —

Joints: — Alignment —

Structural Integrity: —

Hydraulic Capability: —

Means of Control: Gate ✓ Valve _____ Uncontrolled _____

Operation: Operable ✓ Inoperable _____ Other _____

Present Condition (Describe): Gate was operated — appears to be in good condition.

* Outlet of the reservoir drain is visible at the face of the spillway chan

** approximate dimensions, since could not be determined because of discharge flowing. (measured at outlet end).

9) Structural

a. Concrete Surfaces The Spillway reservoir drain-structure concrete surface appears to be in relatively good condition

b. Structural Cracking No structural cracking is visible at Spillway reservoir drain-structure.

c. Movement - Horizontal & Vertical Alignment (Settlement) None Observed

d. Junctions with Abutments or Embankments Junctions with embankment are in good condition

e. Drains - Foundation, Joint, Face None visible

f. Water Passages, Conduits, Sluices Not Accessible

g. Seepage or Leakage None observed.

h. Joints - Construction, etc. None Visible

i. Foundation None Visible — Spillway Structure founded on Glacial till.

j. Abutments None

k. Control Gates No structural control gates on spillway - Reservoir Drain Structure

l. Approach & Outlet Channels The outlet channel is stone masonry lined and in good condition. Minor vegetation growing through the joints and collected debris.

m. Energy Dissipators (Plunge Pool, etc.) None Applicable

n. Intake Structures None

o. Stability No calculations are available; Visual observation indicates there appears to be no problem.

p. Miscellaneous

10) Appurtenant Structures (Powerhouse, Lock, Gatehouse, Other)

a. Description and Condition Only spillway Reservoir drain structure — see previous comments.

HYDROLOGIC DATA AND COMPUTATIONS

APPENDIX D

CHECK LIST FOR DAMS
HYDROLOGIC AND HYDRAULIC
ENGINEERING DATA

AREA-CAPACITY DATA:

	Elevation (ft.)	Surface Area (acres)	Storage Capacity (acre-ft.)
1) Top of Dam	660±	625	3080
2) Design High Water (Max. Design Pool)	—	—	—
3) Auxiliary Spillway Crest	NONE		
4) Pool Level with Flashboards	—		
5) Service Spillway Crest	657	608	1300

DISCHARGES

	Volume (cfs)
1) Average Daily	UNKNOWN
2) Spillway @ Maximum High Water	42
3) Spillway @ Design High Water	UNKNOWN
4) Spillway @ Auxiliary Spillway Crest Elevation	—
5) Low Level Outlet (Reservoir drain)	
6) Total (of all facilities) @ Maximum High Water	
7) Maximum Known Flood	UNKNOWN
8) At Time of Inspection	UNKNOWN

CREST: ELEVATION: 660±

Type: Earth

Width: Varies 25' to 50' Length: 190 FT

Spillover Uncontrolled Concrete Weir

Location about 25' from Right abutment

SPILLWAY:

SERVICE		AUXILIARY
657	Elevation	
Sharp crested - Concrete	Type	
6"	Width	
	Type of Control	
✓	Uncontrolled	
	Controlled:	
—	Type (Flashboards; gate)	
—	Number	
—	Size/Length	
	Invert Material	
	Anticipated Length of operating service	
6' - Sloping	Chute Length	—
8'±	Height Between Spillway Crest & Approach Channel Invert (Weir Flow)	—

— None

HYDROMETEROLOGICAL GAGES: None used

Type : _____

Location: _____

Records:

Date - _____

Max. Reading - _____

FLOOD WATER CONTROL SYSTEM:

Warning System: None

_____

Method of Controlled Releases (mechanisms):

_____

_____

DRAINAGE AREA: 2.7 sq. miles

DRAINAGE BASIN RUNOFF CHARACTERISTICS:

Land Use - Type: approx 60% urban-suburban & 40% woods & pastures.

Terrain - Relief: hilly with relatively steep slopes.

Surface - Soil: glacial till

Runoff Potential (existing or planned extensive alterations to existing (surface or subsurface conditions)

none observed.

Potential Sedimentation problem areas (natural or man-made; present or future)

None in vicinity of lake observed.

Potential Backwater problem areas for levels at maximum storage capacity including surcharge storage:

None

Dikes - Floodwalls (overflow & non-overflow) - Low reaches along the Reservoir perimeter:

Location: _____

Elevation: _____

Reservoir:

Length @ Maximum Pool 0.8 (Miles)

Length of Shoreline (@ Spillway Crest) 5.68 (Miles)

TAMS

Job No. 1579-17
Project LAKE MAHOPAC DAM INSPECTION
Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS

Sheet 1 of
Date MAY 27, 81
By DLC
Ch'k. by

SUB AREA A

L 3.5" = 7000' = 1.3 m.

L_{CA} 1.1" = 2200 = 0.42 mi

$t_p = C_t (L L_{CA})^{0.3}$ use $C_t = 2$

$t_p = 2.0 (1.3 \times 0.42)^{0.3} = 1.67$ hours

$t_R = 1.67/5.5 = 0.30$ hrs.

for $t_R = 0.5$ hours

$t_{PR} = t_p + 0.25(t_R - t_r) = 1.67 + 0.25(0.5 - 0.3)$

$= 1.67 + 0.05 = 1.72$ hours

use $640 C_p = 400$ $C_p = 0.625$

SUB AREA B.

$L = 1.5 = 3000' = 0.57$ mi

$L_{CA} = 0.5 \cdot 1000' = 0.19$ mi

$t_p = C_t (L L_{CA})^{0.3}$ use $C_t = 2$.

$t_p = 2(0.57 \times 0.19)^{0.3} = 1.03$ hours

$t_r = t_p / 5.5 = 1.03 / 5.5 = 0.19$

for $t_R = 0.5$

$t_{PR} = t_p + 0.25(0.5 - 0.19) = 1.03 + 0.08$

$= 1.11$ hrs.

use $640 C_p = 400$ $C_p = 0.625$

TAMS

Job No. 1579-17 Sheet 2 of ____

Project LAKE MAHOPAC DAM Date ____

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS By ____

Ch'k. by ____

ALL SEASON 24 HR 200 SQ MILE PMP = 22 inches

DURATION (HR)	6	12	24	48
% RAINFALL	112	123	133	141

INITIAL RAINFALL LOSS 1.0 inch

CONSTANT RAINFALL LOSS 0.1 inch/hour

CROSS SECTION 1000 FT DOWN STREAM OF DAM

SLOPE 0.038 FT/FT.

	DISTANCE	ELEVATION	
1)	0	660	n = 0.035
2)	250	640	
3)	317	620	
4)	318	614	n = 0.015 (lined channel)
5)	323	614	
6)	324	620	
7)	580	640	n = 0.035
8)	700	660	

TAMS

Job No. 1579-17 Sheet 3 of _____

Project LAKE MAHOPAC DAM SAFETY INVESTIGATION Date MAY 27, 1981

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS. By D.L.C.

Ch'k. by _____

SPILLWAY RATING

Effective width 8.0'

Assume $C = 2.6$ $CXL = 20.8$

$Q = CLH^{1.5}$

EL	h_e	Q
657	0	0
658	1	20.8
660	3	108.1
665	8	470.6
670	13	974.9

DAM LENGTH 190'

TOP OF DAM EL 660' MSL

Sub-area A

6.55 in² = 601.5 Acres = 0.94 Sqmi

Sub-area B

5.75 in² = 528.0 acres = 0.83 SQmi

LAKE AREA PLUS ISLANDS = 6.62 Sqmi = 607.9 acres

LAKE SURFACE AREA AT EL. 657 = (607.9 - 48.7) = 559.2 acres

LAKE SURFACE AREA AT EL 660 = (665.3 - 39.95) = 625.3 acres

LAKE SURFACE AREA AT EL 670 = (771.8 - 33.1) = 738.7 acres

TAMS

Job No. 1579-17 Sheet 4 of _____

Project LAKE MAHOPAC Date MAY 28, 81

Subject HYDROLOGIC / HYDRAULIC COMPUTATIONS By D.L.C

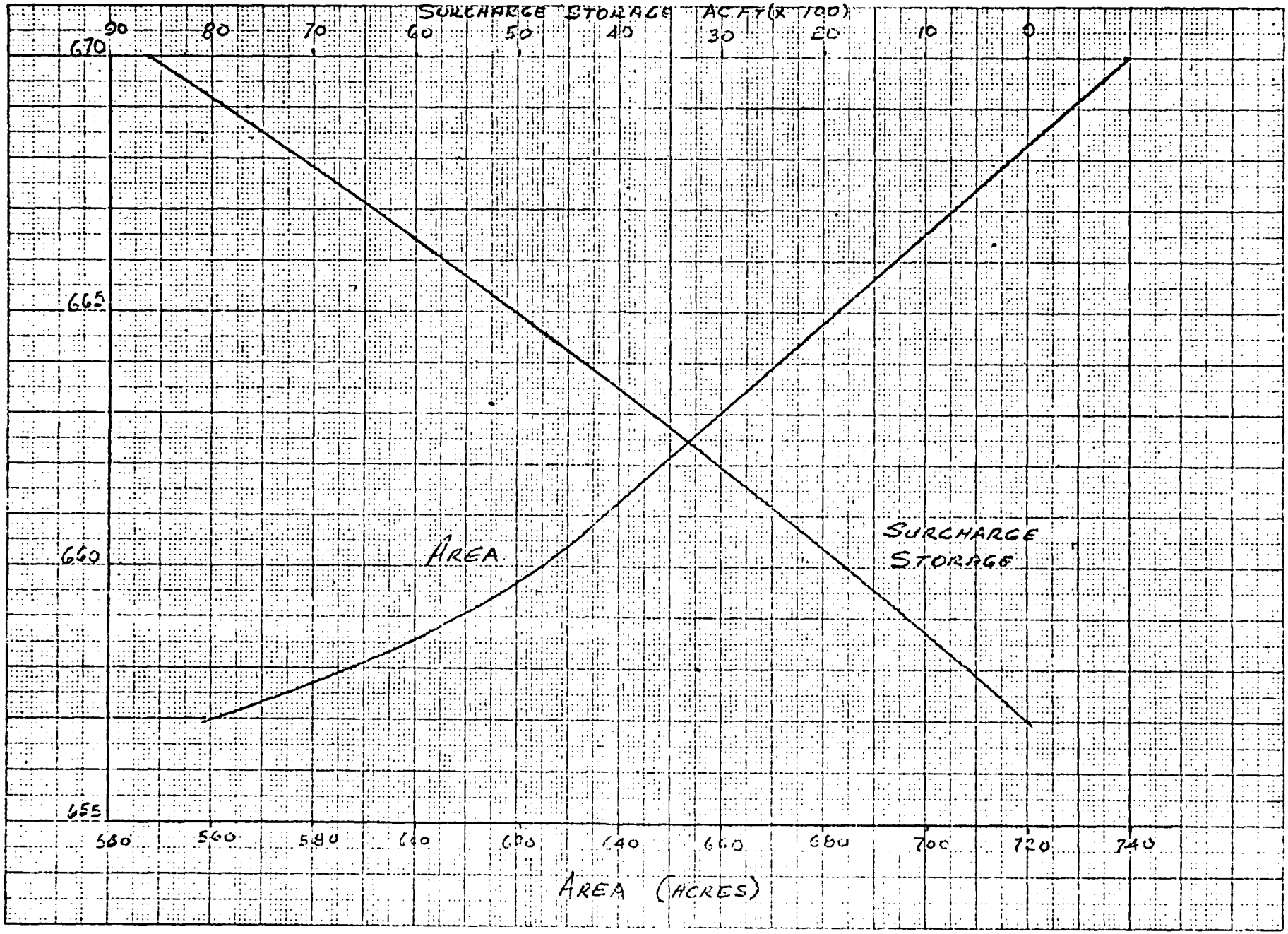
Ch'k. by _____

EL	ΔH	AREA	MEAN AREA	ΔVOL	SURCHARGE STORAGE Ac Ft	STORAGE CAPACITY
657		559.2			0	1300
	1		570.	570		
658		580.8			570	1870
	2		603.	1206		
660		625.3			1780	3080
	5		653.7	3268.		
665		682.			5040	6340
	5		710.4	3552		
670		738.1			8600	9900

- Area of Islands removed from surface area of lake for surcharge storage computations -

- no rainfall losses will be computed for the 48± acres of Islands.

% impervious = 35 % i.e. $\frac{\text{Lake Area}}{\text{Drainage area}} = \frac{608}{1728} \times 100$


SURCHARGE STORAGE AC FT (X 100)
90
80
70
60
50
40
30
20
10
0
670
665
660
655
AREA
SURCHARGE STORAGE
580
600
620
640
660
680
700
720
740
AREA (ACRES)

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01.APR 80
**********
    1     A1                                LAKE MAHOPAC DAM                                1579-17
    2     A2                                PHASE 1 SAFETY INSPECTION
    3     A3                                HEC 1 DB PMF ANALYSIS  MAY 1981
    4     R    100       0      30       0       0       0       0       0       0       0
    5     B1     5
    6     J      1       4       1
    7     J1     1    0.75     0.5    0.25
    8     K                     1                                       1
    9     K1       1 SUB-AREA A RUNOFF
   10     M      1       1     1.4             2.7                                       1
   11     P             22     112     123     133     141
   12     T                                                       1     0.1            0.51
   13     W   1.72   0.625
   14     X     -1    -0.1     1.5
   15     K                     2                                       1
   16     K1       2 SUB-AREA B RUNOFF
   17     M      1       1    1.30             2.7
   18     P             22     112     123     133     141
   19     T                                                       1     0.1            0.57
   20     W   1.11   0.625
   21     X     -1    -0.1     1.5
   22     K      2       3                                       1
   23     K1       3 COMBINE TWO HYDROGRAPHS
   24     K      1       4                                       1
   25     K1       4 ROUTE HYDROGRAPH THROUGH LAKE MAHOPAC
   26     Y                                     1       1
   27     Y1     1                                                1300     -3
   28     Y4   657     658     660     665     670
   29     Y5     0    20.8   105.8   470.6   974.9
   30     S5  1300    1870    3080    6340    9900
   31     S6   657     658     660     665     670
   32     S5   657
   33     S6   660    3.09     1.5     190
   34     K      1       5                                       1
   35     K1       5 CHANNEL ROUTE
   36     Y                                     1       1
   37     Y1     1
   38     Y6 0.035   0.015   0.035     614     660    1000   0.038
   39     Y7     0     660     250     640     317     620     318     614     323     614
   40     Y7   326     650     580     640     700     660
   41     R     99
```

```
**********
FLOOD HYDROGRAPH PACKAGE (HEC-1)
DAM SAFETY VERSION     JULY 1978
  LAST MODIFICATION  01 APR 80
**********

RUN  DATE= 81/07/24.
     TIME= 13.42.48.

                                   LAKE MAHOPAC DAM                                1579-17
                                PHASE 1 SAFETY INSPECTION
                             HEC 1 DB PMF ANALYSIS  MAY 1981

                                   JOB SPECIFICATION
          NQ      NHR     NMIN     IDAY     IHR     IMIN    METRC     IPLT     IPRT    NSTAN
         100       0       30        0       0        0        0        0        0        0
                                   JOPER      NWT    LROPT    TRACE
                                       5        0        0        0

                              MULTI-PLAN ANALYSES TO BE PERFORMED
                                   NPLAN= 1 NRTIO= 4 LRTIO= 1
                        RTIOS=   1.00     .75     .50     .25

**********          **********          **********          **********          **********

                              SUB-AREA RUNOFF COMPUTATION

                        1 SUB-AREA A RUNOFF

                              ISTAQ   ICOMP   IECON   ITAPE   JPLT    JPRT   INAME  ISTAGE  IAUTO
                                  1       0       0       0       0       0       1       0       0

                                   HYDROGRAPH DATA
                    IHYDG    IUNG    TAREA    SNAP    TRSDA    TRSPC    RATIO   ISNOW   ISAME   LOCAL
                        1       1     1.40    0.00     2.70     0.00    0.000       0       1       0

                                   PRECIP DATA
                              SPFE     PMS      R6      R12      R24      R48      R72      R96
                              0.00   22.00  112.00  123.00  133.00  141.00     0.00     0.00
     TRSPC COMPUTED BY THE PROGRAM IS  .600

                                   LOSS DATA
                    LROPT   STRKR   DLTKR   RTIOL   ERAIN   STRKS   RTIOK   STRTL   CNSTL   ALSMX   RTIMP
                        0    0.00    0.00    1.00    0.00    0.00    1.00    1.00     .10    0.00     .51

                                   UNIT HYDROGRAPH DATA
                              TP=  1.72    CP= .63    NTA=  0

                                   RECESSION DATA
                              STRTQ=   -1.00    QRCSN=    -.10    RTIOR= 1.50
     APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 3.98 AND R= 3.19 INTERVALS

                    UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG=  1.72 HOURS, CP=  .63  VOL= 1.00
                   44.     155.     272.     320.     276.     201.     146.     107.      78.      57.
                   41.      30.      22.      16.      12.       8.       6.       5.       3.
```

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.10	0.00	51

UNIT HYDROGRAPH DATA

TP= 1.72 CP= .63 NTA= 0

RECESSION DATA

STRTQ= -1.00 QRCSN= -.10 RTIOR= 1.50

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 3.98 AND R= 3.19 INTERVALS

UNIT HYDROGRAPH 19 END-OF-PERIOD ORDINATES, LAG= 1.72 HOURS, CP= .63 VOL= 1.00

44.	155.	272.	320.	276.	201.	146.	107.	78.	57.	
41.	30.	22.	16.	12.	8.	6.	5.	3.		

END-OF-PERIOD FLOW

NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	NO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.30	1	.00	.00	.00	1.	1.02	1.30	51	.06	.03	.02	21.
1.01	1.00	2	.00	.00	.00	2.	1.02	2.00	52	.06	.03	.02	30.
1.01	1.30	3	.00	.00	.00	2.	1.02	2.30	53	.06	.03	.02	39.
1.01	2.00	4	.00	.00	.00	3.	1.02	3.00	54	.06	.03	.02	45.
1.01	2.30	5	.00	.00	.00	3.	1.02	3.30	55	.06	.03	.02	49.
1.01	3.00	6	.00	.00	.00	3.	1.02	4.00	56	.06	.03	.02	53.
1.01	3.30	7	.00	.00	.00	4.	1.02	4.30	57	.06	.03	.02	55.
1.01	4.00	8	.00	.00	.00	4.	1.02	5.00	58	.06	.03	.02	57.
1.01	4.30	9	.00	.00	.00	4.	1.02	5.30	59	.06	.03	.02	58.
1.01	5.00	10	.00	.00	.00	4.	1.02	6.00	60	.06	.03	.02	59.
1.01	5.30	11	.00	.00	.00	4.	1.02	6.30	61	.16	.14	.02	64.
1.01	6.00	12	.00	.00	.00	4.	1.02	7.00	62	.16	.14	.02	81.
1.01	6.30	13	.01	.00	.00	4.	1.02	7.30	63	.16	.14	.02	109.
1.01	7.00	14	.01	.00	.00	5.	1.02	8.00	64	.16	.14	.02	142.
1.01	7.30	15	.01	.00	.00	5.	1.02	8.30	65	.16	.14	.02	171.
1.01	8.00	16	.01	.00	.00	6.	1.02	9.00	66	.16	.14	.02	191.
1.01	8.30	17	.01	.00	.00	7.	1.02	9.30	67	.16	.14	.02	207.
1.01	9.00	18	.01	.00	.00	8.	1.02	10.00	68	.16	.14	.02	217.
1.01	9.30	19	.01	.00	.00	8.	1.02	10.30	69	.16	.14	.02	225.
1.01	10.00	20	.01	.00	.00	9.	1.02	11.00	70	.16	.14	.02	231.
1.01	10.30	21	.01	.00	.00	9.	1.02	11.30	71	.16	.14	.02	236.
1.01	11.00	22	.01	.00	.00	9.	1.02	12.00	72	.16	.14	.02	239.
1.01	11.30	23	.01	.00	.00	9.	1.02	12.30	73	.99	.96	.02	277.
1.01	12.00	24	.01	.00	.00	9.	1.02	13.00	74	.99	.96	.02	406.
1.01	12.30	25	.06	.03	.03	10.	1.02	13.30	75	1.18	1.16	.02	640.
1.01	13.00	26	.06	.03	.03	14.	1.02	14.00	76	1.18	1.16	.02	935.
1.01	13.30	27	.07	.04	.03	21.	1.02	14.30	77	1.48	1.45	.02	1229.
1.01	14.00	28	.07	.04	.03	30.	1.02	15.00	78	1.48	1.45	.02	1504.
1.01	14.30	29	.09	.05	.04	39.	1.02	15.30	79	1.80	1.77	.02	1773.
1.01	15.00	30	.09	.05	.04	48.	1.02	16.00	80	5.69	5.67	.02	2215.
1.01	15.30	31	.11	.06	.05	56.	1.02	16.30	81	1.38	1.36	.02	2891.
1.01	16.00	32	.34	.19	.15	71.	1.02	17.00	82	1.38	1.36	.02	3511.
1.01	16.30	33	.08	.06	.02	94.	1.02	17.30	83	1.08	1.06	.02	3752.
1.01	17.00	34	.08	.06	.02	118.	1.02	18.00	84	1.08	1.06	.02	3532.
1.01	17.30	35	.07	.04	.02	130.	1.02	18.30	85	.09	.06	.02	3098.
1.01	18.00	36	.07	.04	.02	127.	1.02	19.00	86	.09	.06	.02	2623.
1.01	18.30	37	.01	.00	.00	114.	1.02	19.30	87	.09	.06	.02	2106.
1.01	19.00	38	.01	.00	.00	97.	1.02	20.00	88	.09	.06	.02	1608.
1.01	19.30	39	.01	.00	.00	78.	1.02	20.30	89	.09	.06	.02	1203.
1.01	20.00	40	.01	.00	.00	60	1.02	21.00	90	.09	.06	.02	907.
1.01	20.30	41	.01	.00	.00	45.	1.02	21.30	91	.09	.06	.02	692.
1.01	21.00	42	.01	.00	.00	34.	1.02	22.00	92	.09	.06	.02	533.
1.01	21.30	43	.01	.00	.00	26.	1.02	22.30	93	.09	.06	.02	417.
1.01	22.00	44	.01	.00	.00	21.	1.02	23.00	94	.09	.06	.02	368.
1.01	22.30	45	.01	.00	.00	16.	1.02	23.30	95	.09	.06	.02	353.
1.01	23.00	46	.01	.00	.00	13.	1.03	0.00	96	.09	.06	.02	339.
1.01	23.30	47	.01	.00	.00	13.	1.03	.30	97	0.00	0.00	0.00	326.
1.02	0.00	48	.01	.00	.00	12.	1.03	1.00	98	0.00	0.00	0.00	313.
1.02	.30	49	.06	.03	.02	12.	1.03	1.30	99	0.00	0.00	0.00	300.
1.02	1.00	50	.06	.03	.02	13.	1.03	2.00	100	0.00	0.00	0.00	288.
									SUM	24.82	23.02	1.80	42156.
										(630.)	(585.)	(46.)	(1193.72)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3752.	2486.	845.	420.	42015.

							1.02	23.30	95	.09	.06	.02	348.
		46	.01	.00	.00	13.			96	.09	6		
1.01	23.30	47			.00	13			9.	0.00	0.00	0.00	326.
1.0	.00	48			.00	12.	1.03	1.00	98	0.00	0.00	0.00	313.
1.02	.30	49	.06	.03	.02	12.	1.03	1.30	99	0.00	0.00	0.00	300.
1.02	1.00	50	.06	.03	.02	13.	1.03	2.00	100	0.00	0.00	0.00	288.
									SUM	24.82	23.02	1.80	42156.
										(630.)(	585.)(	46.)(	1193.72)

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3752.	2486.	845.	420.	42015.

CMS	106.	70.	24.	12.	1190.
INCHES		16.52	22.45	23.26	23.26
MM		419.53	570.15	590.91	590.91
AC-FT		1233.	1675.	1736.	1736.
THOUS CU M		1520.	2066.	2142.	2142.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 1

1.	2.	2.	3.	3.	3.	4.	4.	4.	4.
4.	4.	4.	5.	5.	6.	7.	8.	8.	9.
9.	9.	9.	9.	10.	14.	21.	30.	39.	46.
56.	71.	94.	118.	130.	127.	114.	97.	78.	60.
45.	34.	26.	21.	16.	13.	13.	12.	12.	13.
21.	30.	39.	45.	49.	53.	55.	57.	58.	59.
64.	81.	109.	142.	171.	191.	207.	217.	225.	231.
236.	239.	277.	406.	640.	935.	1229.	1504.	1773.	2215.
2591.	3511.	3752.	3532.	3098.	2623.	2106.	1608.	1203.	907.
692.	533.	417.	368.	353.	339.	326.	313.	300.	288.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3752.	2486.	845.	420.	42015.
CMS	106.	70.	24.	12.	1190.
INCHES		16.52	22.45	23.26	23.26
MM		419.53	570.15	590.91	590.91
AC-FT		1233.	1675.	1736.	1736.
THOUS CU M		1520.	2066.	2142.	2142.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 2

1.	1.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	5.	5.	6.	6.	6.
7.	7.	7.	7.	8.	11.	16.	23.	30.	36.
42.	53.	71.	89.	98.	95.	85.	73.	59.	45.
34.	26.	20.	15.	12.	10.	9.	9.	9.	10.
16.	23.	29.	34.	37.	40.	41.	43.	44.	44.
46.	61.	82.	107.	128.	144.	155.	163.	169.	173.
177.	179.	208.	305.	480.	701.	922.	1128.	1330.	1661.
2169.	2633.	2814.	2649.	2324.	1967.	1580.	1206.	902.	680.
519.	400.	313.	276.	265.	254.	244.	234.	225.	216.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2814.	1864.	633.	315.	31512.
CMS	80.	53.	18.	9.	892.
INCHES		12.39	16.84	17.45	17.45
MM		314.65	427.62	443.19	443.19
AC-FT		924.	1256.	1302.	1302.
THOUS CU M		1140.	1550.	1606.	1606.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	3.	3.	4.	4.	4.	4.
4.	5.	5.	5.	5.	7.	11.	15.	20.	24.
28.	35.	47.	59.	65.	63.	57.	49.	39.	30.
23.	17.	13.	10.	8.	7.	6.	6.	6.	7.
10.	15.	19.	22.	25.	26.	28.	29.	29.	30.
32.	40.	55.	71.	85.	96.	103.	109.	113.	116.

[illegible]	[illegible]	313.	276.	265.	254.	244.	234	22[illegible]	2[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2814.	1864.	633.	315.	31512.
CMS	80.	53.	18.	9.	892.
INCHES		12.39	16.84	17.45	17.45
MM		314.65	427.62	443.19	443.19
AC-FT		924.	1256.	1302.	1302.
THOUS CU M		1140.	1550.	1606.	1606.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 3

1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	3.	3.	4.	4.	4.	4.
4.	5.	5.	5.	5.	7.	11.	15.	20.	24.
28.	35.	47.	59.	65.	63.	57.	49.	39.	30.
23.	17.	13.	10.	8.	7.	6.	6.	6.	7.
13.	15.	19.	22.	25.	26.	28.	29.	29.	30.
32.	40.	55.	71.	85.	96.	103.	109.	113.	116.
118.	119.	138.	203.	320.	467.	614.	752.	887.	1107.
1446.	1755.	1876.	1766.	1549.	1312.	1053.	804.	601.	454.
348.	267.	209.	184.	177.	170.	163.	156.	150.	144.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1676.	1243.	422.	210.	21008.
CMS	53.	35.	12.	6.	595.
INCHES		8.26	11.22	11.63	11.63
MM		209.76	285.08	295.46	295.46
AC-FT		616.	838.	868.	868.
THOUS CU M		760.	1033.	1071.	1071.

HYDROGRAPH AT STA 1 FOR PLAN 1, RTIO 4

0.	0.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	2.	2.	2.	2.	2.
2.	2.	2.	2.	3.	4.	5.	8.	10.	12.
14.	18.	24.	30.	33.	32.	28.	24.	20.	15.
11.	9.	7.	5.	4.	3.	3.	3.	3.	3.
5.	8.	10.	11.	12.	13.	14.	14.	15.	15.
16.	20.	27.	36.	43.	48.	52.	54.	56.	58.
59.	60.	69.	102.	160.	234.	307.	376.	443.	554.
723.	878.	938.	883.	775.	656.	527.	402.	301.	227.
173.	133.	104.	92.	88.	85.	81.	78.	75.	72.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	938.	621.	211.	105.	0504.
CMS	27.	18.	6.	3.	297.
INCHES		4.13	5.61	5.82	5.82
MM		104.88	142.54	147.73	147.73
AC-FT		308.	419.	434.	434.
THOUS CU M		380.	517.	535.	535.

********** ********** ********** ********** **********

SUB-AREA RUNOFF COMPUTATION

2 SUB-AREA B RUNOFF

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
2	0	0	0	0	0	1	0	0

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	LOCAL
1	1	1.30	0.00	2.70	0.00	0.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	112.00	122.00	133.00	141.00	0.00	0.00

HYDROGRAPH DATA

IHYDG	IUHG	TAREA	SNAP	TRSDA	TRSPC	RATIO	ISNOW	ISAME	ISAVE
1	0		1	2.	0.0	1.000	0	0	0

PRECIP DATA

SPFE	PMS	R6	R12	R24	R48	R72	R96
0.00	22.00	112.00	123.00	133.00	141.00	0.00	0.00

TRSPC COMPUTED BY THE PROGRAM IS .800

LOSS DATA

LROPT	STRKR	DLTKR	RTIOL	ERAIN	STRKS	RTIOK	STRTL	CNSTL	ALSMX	RTIMP
0	0.00	0.00	1.00	0.00	0.00	1.00	1.00	.10	0.00	.57

UNIT HYDROGRAPH DATA

TP= 1.11 CP= .63 NTA= 0

RECESSION DATA

STRTQ= -1.00 QRCSN= -.10 RTIOR= 1.50

APPROXIMATE CLARK COEFFICIENTS FROM GIVEN SNYDER CP AND TP ARE TC= 2.63 AND R= 1.91 INTERVALS

UNIT HYDROGRAPH 12 END-OF-PERIOD ORDINATES, LAG= 1.11 HOURS, CP= .63 VOL= 1.00

112. 353. 441. 321. 188. 110. 64. 38. 22. 13.
8. 4.

END-OF-PERIOD FLOW

MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q	MO.DA	HR.MN	PERIOD	RAIN	EXCS	LOSS	COMP Q
1.01	.30	1	.00	.00	.00	1.	1.02	1.30	51	.06	.04	.02	36.
1.01	1.00	2	.00	.00	.00	2.	1.02	2.00	52	.06	.04	.02	47.
1.01	1.30	3	.00	.00	.00	3.	1.02	2.30	53	.06	.04	.02	53.
1.01	2.00	4	.00	.00	.00	4.	1.02	3.00	54	.06	.04	.02	57.
1.01	2.30	5	.00	.00	.00	4.	1.02	3.30	55	.06	.04	.02	59.
1.01	3.00	6	.00	.00	.00	4.	1.02	4.00	56	.06	.04	.02	61.
1.01	3.30	7	.00	.00	.00	4.	1.02	4.30	57	.06	.04	.02	61.
1.01	4.00	8	.00	.00	.00	4.	1.02	5.00	58	.06	.04	.02	62.
1.01	4.30	9	.00	.00	.00	4.	1.02	5.30	59	.06	.04	.02	62.
1.01	5.00	10	.00	.00	.00	4.	1.02	6.00	60	.06	.04	.02	62.
1.01	5.30	11	.00	.00	.00	4.	1.02	6.30	61	.16	.14	.02	74.
1.01	6.00	12	.00	.00	.00	4.	1.02	7.00	62	.16	.14	.02	110.
1.01	6.30	13	.01	.01	.00	5.	1.02	7.30	63	.16	.14	.02	155.
1.01	7.00	14	.01	.01	.00	6.	1.02	8.00	64	.16	.14	.02	186.
1.01	7.30	15	.01	.01	.00	7.	1.02	8.30	65	.16	.14	.02	207.
1.01	8.00	16	.01	.01	.00	8.	1.02	9.00	66	.16	.14	.02	218.
1.01	8.30	17	.01	.01	.00	9.	1.02	9.30	67	.16	.14	.02	225.
1.01	9.00	18	.01	.01	.00	9.	1.02	10.00	68	.16	.14	.02	229.
1.01	9.30	19	.01	.01	.00	10.	1.02	10.30	69	.16	.14	.02	231.
1.01	10.00	20	.01	.01	.00	10.	1.02	11.00	70	.16	.14	.02	232.
1.01	10.30	21	.01	.01	.00	10.	1.02	11.30	71	.16	.14	.02	233.
1.01	11.00	22	.01	.01	.00	10.	1.02	12.00	72	.16	.14	.02	234.
1.01	11.30	23	.01	.01	.00	10.	1.02	12.30	73	.99	.96	.02	326.
1.01	12.00	24	.01	.01	.00	10.	1.02	13.00	74	.99	.96	.02	615.
1.01	12.30	25	.06	.03	.03	13.	1.02	13.30	75	1.18	1.16	.02	1000.
1.01	13.00	26	.06	.03	.03	23.	1.02	14.00	76	1.18	1.16	.02	1334.
1.01	13.30	27	.07	.04	.03	36.	1.02	14.30	77	1.48	1.46	.02	1609.
1.01	14.00	28	.07	.04	.03	47.	1.02	15.00	78	1.48	1.46	.02	1867.
1.01	14.30	29	.09	.05	.04	57.	1.02	15.30	79	1.80	1.78	.02	2123.
1.01	15.00	30	.09	.05	.04	66.	1.02	16.00	80	5.69	5.67	.02	2819.
1.01	15.30	31	.11	.06	.05	74.	1.02	16.30	81	1.38	1.36	.02	3927.
1.01	16.00	32	.34	.21	.13	100.	1.02	17.00	82	1.38	1.36	.02	4287.
1.01	16.30	33	.08	.06	.02	144.	1.02	17.30	83	1.08	1.06	.02	3692.
1.01	17.00	34	.08	.06	.02	163.	1.02	18.00	84	1.08	1.06	.02	2987.
1.01	17.30	35	.07	.04	.02	146.	1.02	18.30	85	.09	.07	.02	2392.
1.01	18.00	36	.07	.04	.02	121.	1.02	19.00	86	.09	.07	.02	1741.
1.01	18.30	37	.01	.00	.00	98.	1.02	19.30	87	.09	.07	.02	1124.
1.01	19.00	38	.01	.00	.00	72.	1.02	20.00	88	.09	.07	.02	701.
1.01	19.30	39	.01	.00	.00	47.	1.02	20.30	89	.09	.07	.02	453.
1.01	20.00	40	.01	.00	.00	29.	1.02	21.00	90	.09	.07	.02	414.
1.01	20.30	41	.01	.00	.00	19.	1.02	21.30	91	.09	.07	.02	398.
1.01	21.00	42	.01	.00	.00	16.	1.02	22.00	92	.09	.07	.02	382.
1.01	21.30	43	.01	.00	.00	15.	1.02	22.30	93	.09	.07	.02	367.
1.01	22.00	44	.01	.00	.00	15.	1.02	23.00	94	.09	.07	.02	352.
1.01	22.30	45	.01	.00	.00	14.	1.02	23.30	95	.09	.07	.02	338.
1.01	23.00	46	.01	.00	.00	14.	1.03	0.00	96	.09	.07	.02	325.

[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.01	16.00	33	.34	.21	.13	100.	1.02	17.00	82	1.38	1.36	.02	4287.	
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
1.01	17.00	34	.09	.06	.02	169.	1.02	18.00	84	1.06	1.06	.02	2987.	
1.01	17.30	35	.07	.04	.02	146.	1.02	18.30	85	.09	.07	.02	2392.	
1.01	18.00	36	.07	.04	.02	121.	1.02	19.00	86	.09	.07	.02	1741.	
1.01	18.30	37	.01	.00	.00	98.	1.02	19.30	87	.09	.07	.02	1124.	
1.01	19.00	38	.01	.00	.00	72.	1.02	20.00	88	.09	.07	.02	701.	
1.01	19.30	39	.01	.00	.00	47.	1.02	20.30	89	.09	.07	.02	453.	
1.01	20.00	40	.01	.00	.00	29.	1.02	21.00	90	.09	.07	.02	414.	
1.01	20.30	41	.01	.00	.00	19.	1.02	21.30	91	.09	.07	.02	398.	
1.01	21.00	42	.01	.00	.00	16.	1.02	22.00	92	.09	.07	.02	382.	
1.01	21.30	43	.01	.00	.00	15.	1.02	22.30	93	.09	.07	.02	367.	
1.01	22.00	44	.01	.00	.00	15.	1.02	23.00	94	.09	.07	.02	352.	
1.01	22.30	45	.01	.00	.00	14.	1.02	23.30	95	.09	.07	.02	338.	
1.01	23.00	46	.01	.00	.00	14.	1.03	0.00	96	.09	.07	.02	325.	
1.01	23.30	47	.01	.00	.00	13.	1.03	.30	97	0.00	0.00	0.00	312.	
1.02	0.00	48	.01	.00	.00	13.	1.03	1.00	98	0.00	0.00	0.00	300.	
1.02	.30	49	.04	.04	.02	12.	1.03	1.30	99	0.00	0.00	0.00	288.	
1.02	1.00	50	.06	.04	.02	21.	1.03	2.00	100	0.00	0.00	0.00	276.	
									SUM	24.82	23.24	1.58	41179.	
										(630.)	(590.)	(40.)	(1166.06)	

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4287.	2487.	822.	410.	41039.
CMS	121.	70.	23.	12.	1162.
INCHES		17.79	23.52	24.47	24.47
MM		451.94	597.49	621.59	621.59
AC-FT		1233.	1630.	1696.	1696.
THOUS CU M		1521.	2011.	2092.	2092.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 1

1.	2.	3.	4.	4.	4.	4.	4.	4.	4.
4.	4.	5.	6.	7.	8.	9.	9.	10.	10.
10.	10.	10.	10.	13.	23.	36.	47.	57.	66.
74.	100.	144.	163.	146.	121.	98.	72.	47.	29.
19.	16.	15.	15.	14.	14.	13.	13.	12.	21.
36.	47.	53.	57.	59.	61.	61.	62.	62.	62.
74.	110.	155.	188.	207.	218.	225.	229.	231.	232.
233.	234.	326.	615.	1000.	1334.	1609.	1867.	2123.	2819.
3927.	4287.	3692.	2987.	2392.	1741.	1124.	701.	453.	414.
398.	382.	367.	352.	338.	325.	312.	300.	288.	276.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	4287.	2487.	822.	410.	41039.
CMS	121.	70.	23.	12.	1162.
INCHES		17.79	23.52	24.47	24.47
MM		451.94	597.49	621.59	621.59
AC-FT		1233.	1630.	1696.	1696.
THOUS CU M		1521.	2011.	2092.	2092.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 2

1.	2.	2.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	4.	5.	6.	7.	7.	7.	7.
7.	7.	7.	7.	10.	17.	27.	36.	43.	49.
56.	75.	108.	122.	109.	91.	73.	54.	35.	22.
14.	12.	11.	11.	11.	10.	10.	9.	9.	16.
27.	35.	40.	43.	45.	45.	46.	46.	47.	47.
55.	82.	116.	141.	155.	164.	169.	172.	173.	174.
175.	175.	245.	461.	750.	1001.	1207.	1400.	1592.	2114.
2946.	3215.	2749.	2240.	1794.	1305.	843.	526.	339.	311.
298.	287.	275.	264.	254.	244.	234.	225.	216.	207.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3215.	1865.	616.	308.	30780.
CMS	91.	53.	17.	9.	872.
INCHES		13.34	17.64	18.35	18.35
MM		338.96	448.12	466.19	466.19
AC-FT		925.	1223.	1272.	1272.
THOUS CU M		1141.	1509.	1569.	1569.

55.	82.	116.	141.	155.	164.	169.	172.	173.	174.
175	197	217	[illegible]	[illegible]	[illegible]	[illegible]7.	[illegible]00.	1592.	2114
2646.	321[illegible]	27[illegible]	2[illegible]	[illegible]	[illegible]	3.	26.	339.	311.
298.	287.	275.	264.	254.	244.	234.	225.	216.	207.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3215.	1865.	616.	308.	30780.
CMS	91.	53.	17.	9.	872.
INCHES		13.34	17.64	18.35	18.35
MM		338.96	448.12	466.19	466.19
AC-FT		925.	1223.	1272.	1272.
THOUS CU M		1141.	1508.	1569.	1569.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 3

1.	1.	1.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	4.	4.	4.	5.	5.	5.
5.	5.	5.	5.	6.	11.	18.	24.	28.	33.
37.	50.	72.	81.	73.	61.	49.	36.	23.	15.
10.	8.	8.	7.	7.	7.	7.	6.	6.	11.
16.	24.	27.	29.	30.	30.	31.	31.	31.	31.
37.	55.	77.	94.	104.	109.	113.	114.	116.	116.
117.	117.	163.	307.	500.	667.	805.	933.	1061.	1409.
1954.	2143.	1846.	1494.	1196.	870.	562.	350.	226.	207.
199.	191.	183.	176.	169.	162.	156.	150.	144.	138.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	2143.	1243.	411.	205.	20520.
CMS	61.	35.	12.	6.	581.
INCHES		8.90	11.76	12.24	12.24
MM		225.97	298.75	310.79	310.79
AC-FT		617.	815.	848.	848.
THOUS CU M		760.	1005.	1046.	1046.

HYDROGRAPH AT STA 2 FOR PLAN 1, RTIO 4

0.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	3.	6.	9.	12.	14.	16.
19.	25.	36.	41.	36.	30.	24.	18.	12.	7.
5.	4.	4.	4.	4.	3.	3.	3.	3.	5.
9.	12.	13.	14.	15.	15.	15.	15.	16.	16.
15.	27.	39.	47.	52.	55.	56.	57.	58.	58.
58.	59.	92.	154.	250.	334.	402.	467.	531.	705.
952.	1072.	923.	747.	598.	435.	281.	175.	113.	104.
99.	96.	92.	88.	85.	81.	78.	75.	72.	69.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1072.	622.	205.	103.	10260.
CMS	30.	18.	6.	3.	291.
INCHES		4.45	5.88	6.12	6.12
MM		112.99	149.37	155.40	155.40
AC-FT		308.	408.	424.	424.
THOUS CU M		380.	503.	523.	523.

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COMBINE HYDROGRAPHS

3 COMBINE TWO HYDROGRAPHS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIO 1

3.	4.	5.	6.	7.	7.	8.	8.	8.	8.

COP HYDR HS

3 COMBINE TWO HYDROGRAPHS

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
3	2	0	0	0	0	1	0	0

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIO 1

3.	4.	5.	6.	7.	7.	8.	8.	8.	8.
5.	8.	9.	10.	13.	15.	16.	17.	18.	18.
19.	19.	19.	19.	23.	37.	57.	78.	96.	114.
131.	171.	238.	281.	276.	248.	211.	169.	125.	89.
64.	50.	42.	35.	30.	27.	26.	25.	24.	34.
57.	77.	92.	102.	109.	113.	117.	119.	120.	121.
138.	191.	264.	330.	378.	410.	432.	446.	457.	464.
489.	472.	603.	1021.	1640.	2269.	2838.	3370.	3696.	5033.
6815.	7797.	7444.	6520.	5490.	4364.	3230.	2309.	1655.	1322.
1060.	915.	784.	720.	691.	664.	638.	612.	588.	565.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	7797.	4924.	1666.	831.	83055.
CMS	221.	139.	47.	24.	2352.
INCHES		16.97	22.97	23.85	23.85
MM		430.92	583.32	605.68	605.68
AC-FT		2442.	3305.	3432.	3432.
THOUS CU M		3012.	4077.	4233.	4233.

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIO 2

2.	3.	4.	5.	5.	6.	6.	6.	6.	6.
6.	6.	6.	8.	10.	11.	12.	13.	13.	14.
14.	14.	14.	14.	17.	28.	43.	58.	72.	85.
98.	128.	179.	211.	207.	186.	159.	127.	94.	67.
48.	38.	31.	26.	23.	20.	19.	18.	18.	26.
43.	58.	69.	77.	82.	85.	87.	89.	90.	91.
104.	143.	198.	248.	283.	307.	324.	335.	342.	348.
352.	354.	452.	766.	1230.	1702.	2129.	2528.	2922.	3775.
5114.	5848.	5583.	4890.	4117.	3273.	2423.	1732.	1241.	991.
817.	686.	588.	540.	519.	498.	478.	459.	441.	423.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	5848.	3693.	1250.	623.	62291.
CMS	166.	105.	35.	18.	1764.
INCHES		12.72	17.22	17.88	17.88
MM		323.19	437.49	454.26	454.26
AC-FT		1831.	2479.	2574.	2574.
THOUS CU M		2259.	3058.	3175.	3175.

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIO 3

1.	2.	3.	3.	3.	4.	4.	4.	4.	4.
4.	4.	4.	5.	6.	7.	8.	9.	9.	9.
9.	9.	9.	9.	12.	19.	29.	39.	48.	57.
85.	83.	119.	140.	138.	124.	106.	84.	62.	45.
32.	25.	21.	18.	15.	13.	13.	12.	12.	17.
26.	39.	46.	51.	54.	57.	58.	59.	60.	61.
69.	95.	132.	165.	189.	205.	216.	223.	228.	232.
224.	236.	301.	510.	820.	1134.	1419.	1685.	1948.	2517.
3409.	3899.	3722.	3260.	2745.	2182.	1615.	1155.	828.	661.
545.	458.	392.	360.	346.	332.	319.	306.	294.	282.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3899.	2462.	833.	415.	41527.
CMS	110.	70.	24.	12.	1176.
INCHES		8.48	11.48	11.92	11.92

0.	0.	0.	0.	12.	19.	29.	39.	48.	57.
			1.	8.	24.	106.	84	6	4
28.	39.	46.	51.	54.	57.	58.	59.	60.	61.
89.	95.	132.	165.	189.	205.	216.	223.	228.	232.
234.	236.	301.	510.	820.	1134.	1419.	1685.	1948.	2517.
3409.	3899.	3722.	3260.	2745.	2182.	1615.	1155.	828.	661.
545.	458.	392.	360.	346.	332.	319.	306.	294.	282.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	3899.	2462.	833.	415.	41527.
CMS	110.	70.	24.	12.	1176.
INCHES		8.48	11.48	11.92	11.92
MM		215.46	291.66	302.84	302.84
AC-FT		1221.	1653.	1716.	1716.
THOUS CU M		1506.	2039.	2117.	2117.

SUM OF 2 HYDROGRAPHS AT 3 PLAN 1 RTIO 4

1.	1.	1.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	3.	3.	4.	4.	4.	4.	5.
5.	5.	5.	5.	6.	9.	14.	19.	24.	28.
35.	43.	60.	70.	69.	62.	53.	42.	31.	22.
16.	13.	10.	9.	8.	7.	6.	6.	6.	9.
14.	19.	23.	26.	27.	28.	29.	30.	30.	30.
35.	48.	66.	83.	94.	102.	108.	112.	114.	116.
117.	178.	151.	255.	410.	567.	710.	843.	974.	1258.
1705.	1949.	1861.	1630.	1372.	1091.	808.	577.	414.	330.
272.	229.	196.	180.	173.	166.	159.	153.	147.	141.

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1949.	1231.	417.	208.	20764.
CMS	55.	35.	12.	6.	588.
INCHES		4.24	5.74	5.96	5.96
MM		107.73	145.83	151.42	151.42
AC-FT		610.	826.	858.	858.
THOUS CU M		753.	1019.	1058.	1058.

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HYDROGRAPH ROUTING

4 ROUTE HYDROGRAPH THROUGH LAKE MAHOPAC

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
4	1	0	0	0	0	1	0	0

ROUTING DATA

GLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	1300.	-1

STAGE	657.00	658.00	660.00	665.00	670.00
FLOW	0.00	20.80	108.80	470.60	974.90
CAPACITY=	1300.	1870.	3080.	6340.	9900.
ELEVATION=	657.	658.	660.	665.	670.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
657.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
660.0	3.1	1.5	190.

ROUTING DATA

			IR	ISAME	IOPT	IPMP	ISTR
0.0	[illegible]	0.00			0	0	1

	NSTPS	NSTDL	LAG	APSKK	X	TSK	STORA	ISPRAT
	1	0	0	0.000	0.000	0.000	1300.	-1

STAGE	657.00	658.00	660.00	665.00	670.00
FLOW	0.00	20.80	108.80	470.60	974.90
CAPACITY=	1303.	1870.	3080.	6340.	9900.
ELEVATION=	657.	658.	660.	665.	670.

CREL	SPWID	COQW	EXPW	ELEVL	COQL	CAREA	EXPL
657.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

DAM DATA

TOPEL	COQD	EXPD	DAMWID
660.0	3.1	1.5	190.

STATION 4, PLAN 1, RATIO 1

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	2.	2.	2.	3.	3.	3.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	5.	5.	5.	5.	5.	5.	5.	6.	6.
6.	6.	7.	7.	7.	8.	9.	9.	10.	11.
11.	12.	13.	14.	16.	19.	25.	34.	45.	58.
76.	97.	191.	467.	764.	1021.	1206.	1315.	1363.	1372.
1334.	1334.	1300.	1262.	1223.	1186.	1149.	1114.	1080.	1047.

STORAGE

1300.	1300.	1300.	1301.	1301.	1301.	1302.	1302.	1302.	1303.
1303.	1303.	1304.	1304.	1304.	1305.	1306.	1306.	1307.	1308.
1308.	1309.	1310.	1311.	1312.	1313.	1315.	1318.	1321.	1325.
1330.	1337.	1345.	1356.	1367.	1378.	1387.	1395.	1401.	1405.
1408.	1410.	1412.	1413.	1415.	1416.	1416.	1417.	1418.	1419.
1421.	1423.	1427.	1431.	1435.	1439.	1444.	1448.	1453.	1458.
1463.	1469.	1479.	1491.	1505.	1521.	1538.	1556.	1574.	1593.
1611.	1630.	1652.	1695.	1739.	1819.	1924.	2051.	2200.	2382.
2604.	2862.	3231.	3586.	3729.	3896.	4007.	4069.	4096.	4101.
4096.	4080.	4060.	4039.	4016.	3995.	3973.	3952.	3932.	3912.

STAGE

657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.1	657.1	657.1	657.1	657.1	657.1	657.2	657.2	657.2	657.2
657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.2
657.2	657.2	657.2	657.2	657.2	657.2	657.3	657.3	657.3	657.3
657.3	657.3	657.3	657.3	657.4	657.4	657.4	657.4	657.5	657.5
657.5	657.6	657.6	657.7	657.8	657.9	658.1	658.3	658.5	658.8
659.2	659.7	660.2	660.7	661.0	661.3	661.4	661.5	661.6	661.6
661.6	661.5	661.5	661.5	661.4	661.4	661.4	661.3	661.3	661.3

PEAK OUTFLOW IS 1372. AT TIME 45.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1372.	1262.	412.	199.	19856.
CMS	39.	36.	12.	6.	562.
INCHES		4.35	5.68	5.70	5.70
MM		110.40	144.21	144.80	144.90
AC-FT		626.	817.	820.	820.
THOUS CU M		772.	1008.	1012.	1012.

THOUS CU M	772.	1008.	1012.	1312.

STATION 4, PLAN 1, RATIO 2

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	1.	1.	2.	2.	2.	2.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	4.	4.	4.	4.	4.	4.	4.
4.	5.	5.	5.	6.	6.	7.	7.	7.	8.
8.	9.	10.	11.	12.	14.	17.	21.	28.	38.
52.	69.	85.	100.	134.	239.	341.	418.	469.	501.
521.	533.	538.	540.	539.	538.	535.	532.	528.	523.

STORAGE

1300.	1300.	1300.	1301.	1301.	1301.	1301.	1301.	1302.	1302.
1302.	1302.	1303.	1303.	1303.	1304.	1304.	1305.	1305.	1306.
1306.	1307.	1307.	1308.	1309.	1310.	1311.	1313.	1316.	1319.
1323.	1327.	1334.	1342.	1350.	1358.	1365.	1371.	1376.	1379.
1381.	1383.	1384.	1385.	1386.	1387.	1387.	1388.	1389.	1389.
1391.	1393.	1395.	1398.	1401.	1404.	1408.	1411.	1415.	1419.
1422.	1427.	1434.	1443.	1454.	1466.	1478.	1492.	1505.	1519.
1534.	1548.	1564.	1589.	1630.	1690.	1768.	1863.	1975.	2112.
2284.	2519.	2751.	2963.	3145.	3290.	3395.	3465.	3509.	3535.
3551.	3560.	3564.	3565.	3565.	3564.	3562.	3559.	3556.	3552.

STAGE

657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.1	657.1	657.2	657.2	657.2	657.2	657.2	657.2
657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.2
657.2	657.2	657.2	657.3	657.3	657.3	657.3	657.3	657.4	657.4
657.4	657.4	657.5	657.5	657.6	657.7	657.8	658.0	658.2	658.4
658.7	659.1	659.5	659.8	660.1	660.3	660.5	660.6	660.7	660.7
660.7	660.7	660.7	660.7	660.7	660.7	660.7	660.7	660.7	660.7

PEAK OUTFLOW IS 540. AT TIME 47.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	540.	520.	161.	78.	7796.
CMS	15.	15.	5.	2.	221.
INCHES		1.79	2.22	2.24	2.24
MM		45.54	56.41	56.85	56.85
AC-FT		258.	320.	322.	322.
THOUS CU M		318.	394.	397.	397.

STATION 4, PLAN 1, RATIO 3

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	4.	4.	5.	5.	5.
6.	6.	6.	7.	8.	9.	11.	14.	16.	20.

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	4.	4.	5.	5.	5.
6.	6.	6.	7.	8.	9.	11.	14.	16.	20.
26.	38.	50.	60.	69.	76.	82.	85.	88.	90.
92.	93.	94.	95.	96.	96.	97.	98.	98.	99.

STORAGE

1300.	1300.	1300.	1300.	1300.	1301.	1301.	1301.	1301.	1301.
1301.	1302.	1302.	1302.	1302.	1302.	1303.	1303.	1303.	1304.
1304.	1305.	1305.	1305.	1306.	1306.	1307.	1309.	1311.	1313.
1315.	1318.	1322.	1328.	1334.	1339.	1344.	1347.	1350.	1353.
1354.	1355.	1356.	1357.	1357.	1358.	1358.	1359.	1359.	1360.
1360.	1362.	1363.	1365.	1367.	1370.	1372.	1374.	1377.	1379.
1381.	1385.	1389.	1395.	1402.	1410.	1419.	1428.	1437.	1446.
1456.	1465.	1476.	1493.	1520.	1560.	1612.	1676.	1750.	1842.
1963.	2113.	2288.	2410.	2532.	2630.	2705.	2759.	2797.	2824.
2845.	2862.	2876.	2887.	2898.	2908.	2917.	2926.	2935.	2942.

STAGE

657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.2	657.2	657.2	657.2	657.2	657.2	657.2	657.3
657.3	657.3	657.3	657.3	657.4	657.5	657.5	657.7	657.8	658.0
658.2	658.4	658.7	658.9	659.1	659.3	659.4	659.5	659.5	659.6
659.6	659.6	659.7	659.7	659.7	659.7	659.7	659.7	659.8	659.8

PEAK OUTFLOW IS 99. AT TIME 50.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	99.	94.	36.	18.	1780.
CMS	3.	3.	1.	1.	50.
INCHES		.32	.50	.51	.51
MM		8.23	12.68	12.98	12.98
AC-FT		47.	72.	74.	74.
THOUS CU M		58.	89.	91.	91.

STATION 4, PLAN 1, RATIO 4

END-OF-PERIOD HYDROGRAPH ORDINATES

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	2.	2.	2.	2.	2.	3.
3.	3.	3.	4.	4.	5.	6.	7.	8.	10.
12.	15.	18.	20.	24.	28.	31.	33.	34.	35.
36.	36.	37.	37.	38.	38.	39.	39.	39.	40.

STORAGE

1300.	1300.	1300.	1300.	1300.	1300.	1300.	1300.	1301.	1301.
1301.	1301.	1301.	1301.	1301.	1301.	1301.	1302.	1302.	1302.
1302.	1302.	1302.	1303.	1303.	1303.	1304.	1304.	1305.	1306.

12.	13.	18.	20.	24.	5.	6.	7.	2.	3.
36.	36.	37.	37	3			39.	39.	40.

STORAGE

1300.	1300.	1300.	1300.	1300.	1300.	1300.	1300.	1301.	1301.
1301.	1301.	1301.	1301.	1301.	1301.	1301.	1302.	1302.	1302.
1302.	1302.	1302.	1303.	1303.	1303.	1304.	1304.	1305.	1306.
1308.	1309.	1311.	1314.	1317.	1319.	1322.	1324.	1325.	1326.
1327.	1328.	1328.	1328.	1329.	1329.	1329.	1329.	1330.	1330.
1330.	1331.	1332.	1333.	1334.	1335.	1336.	1337.	1338.	1339.
1341.	1342.	1345.	1348.	1351.	1355.	1359.	1364.	1368.	1373.
1378.	1383.	1388.	1396.	1410.	1430.	1456.	1488.	1525.	1571.
1632.	1706.	1785.	1856.	1917.	1967.	2005.	2032.	2051.	2065.
2076.	2085.	2092.	2099.	2104.	2110.	2115.	2120.	2124.	2129.

STAGE

657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0	657.0
657.0	657.0	657.0	657.0	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1	657.1
657.1	657.1	657.2	657.2	657.2	657.2	657.3	657.3	657.4	657.5
657.6	657.7	657.9	658.0	658.1	658.2	658.2	658.3	658.3	658.3
658.3	658.4	658.4	658.4	658.4	658.4	658.4	658.4	658.4	658.4

PEAK OUTFLOW IS 40. AT TIME 50.00 HOURS

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40.	37.	14.	7.	712.
CMS	1.	1.	0.	0.	20.
INCHES		.13	.20	.20	.20
MM		3.24	5.04	5.19	5.19
AC-FT		18.	29.	29.	29.
THOUS CU M		23.	35.	36.	36.

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HYDROGRAPH ROUTING

5 CHANNEL ROUTE

ISTAQ	ICOMP	IECON	ITAPE	JPLT	JPRT	INAME	ISTAGE	IAUTO
5	1	0	0	0	0	1	0	0

ROUTING DATA

QLOSS	CLOSS	AVG	IRES	ISAME	IOPT	IPMP	LSTR
0.0	0.000	0.00	1	1	0	0	0

NSTPS	NSTDL	LAG	AMSKK	X	TSK	STORA	ISPRAT
1	0	0	0.000	0.000	0.000	0.	0

NORMAL DEPTH CHANNEL ROUTING

SN(1)	SN(2)	SN(3)	ELEVT	ELMAX	RLNTH	SEL
.0350	.0150	.0350	614.0	660.0	1000.	.03800

NORMAL DEPTH CHANNEL ROUTING

QN(1)	QN(2)	QN(3)	ELNVT	ELMAX	RLNTH	SEL
.0350	.0150	.0350	614.0	660.0	1000.	.03500

CROSS SECTION COORDINATES--STA,ELEV,STA,ELEV--ETC
0.00 660.00 250.00 640.00 317.00 620.00 318.00 614.00 323.00 614.00
324.00 650.00 580.00 640.00 700.00 660.00

STORAGE	0.00	.29	.61	1.01	1.82	3.08	4.79	6.97	9.59	12.67
	16.20	20.39	29.00	43.55	64.04	90.44	120.63	153.32	188.49	226.15
OUTFLOW	0.00	289.85	757.77	1390.03	2401.68	4003.80	6395.30	9752.42	14237.34	20001.96
	27190.14	34723.95	43906.00	61903.31	91031.12	134250.26	196915.93	274237.33	366302.02	473362.96
STAGE	614.00	616.42	618.84	621.26	623.68	626.11	628.53	630.95	633.37	635.79
	638.21	640.63	643.05	645.47	647.89	650.32	652.74	655.16	657.58	660.00
FLOW	0.00	289.85	757.77	1390.03	2401.68	4003.80	6395.30	9752.42	14237.34	20001.96
	27190.14	34723.95	43906.00	61903.31	91031.12	134250.26	196915.93	274237.33	366302.02	473362.96

STATION 5, PLAN 1, RTIO 1

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	1.	1.	1.	1.
1.	1.	2.	2.	2.	3.	3.	3.	4.	4.
4.	4.	4.	4.	4.	4.	4.	4.	4.	4.
4.	5.	5.	5.	5.	5.	5.	5.	6.	6.
6.	6.	7.	7.	7.	8.	9.	9.	10.	11.
11.	12.	13.	14.	16.	19.	25.	34.	44.	58.
75.	97.	197.	460.	761.	1016.	1205.	1313.	1363.	1371.
1361.	1334.	1301.	1262.	1224.	1186.	1151.	1114.	1081.	1047.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.

STAGE

614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.1
614.1	614.1	614.1	614.1	614.1	614.2	614.2	614.3	614.4	614.5
614.6	614.8	615.6	617.3	618.9	619.8	620.6	621.0	621.2	621.2
621.2	621.0	620.9	620.8	620.6	620.5	620.3	620.2	620.1	619.9

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1371.	1261.	412.	198.	19837.
CMS	39.	36.	12.	6.	562.
INCHES		4.35	5.67	5.70	5.70
MM		110.39	144.07	144.66	144.66

614.6	614.5	615.6	617.3	618.9	619.8	620.6	621.0	621.2	621.2
621.2	621.0	620.9	620.8	620.6	620.5	620.[illegible]	620.[illegible]	[illegible]	[illegible]

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	1371.	1261.	412.	198.	19837.
CMS	39.	36.	12.	6.	562.
INCHES		4.35	5.67	5.70	5.70
MM		110.39	144.07	144.66	144.66
AC-FT		625.	816.	820.	820.
THOUS CU M		772.	1007.	1011.	1011.

MAXIMUM STORAGE = 1.

MAXIMUM STAGE IS 621.2

STATION 5, PLAN 1, RTIO 2

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	1.	1.
1.	1.	1.	2.	2.	2.	2.	3.	3.	3.
3.	3.	3.	3.	3.	3.	3.	3.	3.	3.
3.	3.	3.	4.	4.	4.	4.	4.	4.	4.
4.	5.	5.	5.	6.	6.	7.	7.	7.	8.
9.	9.	10.	11.	12.	14.	17.	20.	28.	38.
51.	65.	84.	100.	133.	235.	341.	417.	469.	500.
522.	532.	539.	539.	540.	537.	536.	531.	528.	522.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.1	614.1	614.1	614.1	614.1
614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.2	614.2	614.3
614.4	614.6	614.7	614.8	615.1	616.0	616.7	617.1	617.3	617.5
617.6	617.7	617.7	617.7	617.7	617.7	617.7	617.7	617.7	617.6

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	540.	520.	161.	78.	7785.
CMS	15.	15.	5.	2.	220.
INCHES		1.79	2.22	2.24	2.24
MM		45.53	56.33	56.77	56.77
AC-FT		258.	319.	322.	322.
THOUS CU M		318.	394.	397.	397.

MAXIMUM STORAGE = 0.

AC-FT [illegible] [illegible] 322. [illegible]
HOUS [illegible] 8. .94. 397. [illegible]

MAXIMUM STORAGE = 0.

MAXIMUM STAGE IS 617.7

STATION 5, PLAN 1, RTIO 3

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
1.	1.	1.	1.	1.	1.	2.	2.	2.	2.
2.	2.	2.	2.	2.	2.	2.	2.	2.	2.
2.	2.	2.	2.	2.	3.	3.	3.	3.	3.
3.	3.	3.	3.	4.	4.	4.	5.	5.	5.
6.	6.	6.	7.	8.	9.	11.	14.	16.	20.
27.	38.	49.	60.	69.	76.	81.	85.	88.	90.
92.	93.	94.	95.	96.	96.	97.	98.	98.	99.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.2
614.2	614.3	614.4	614.5	614.6	614.6	614.7	614.7	614.7	614.8
614.8	614.8	614.8	614.8	614.8	614.8	614,8	614.8	614.8	614.8

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	99.	94.	36.	18.	1778.
CMS	3.	3.	1.	1.	50.
INCHES		.32	.50	.51	.51
MM		8.23	12.67	12.96	12.96
AC-FT		47.	72.	73.	73.
THOUS CU M		58.	89.	91.	91.

MAXIMUM STORAGE = 0.

MAXIMUM STAGE IS 614.8

STATION 5, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	3.	1.	1.	1	1	[illegible]	[illegible]	[illegible]

[illegible]	[illegible]	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
[illegible]	[illegible]	614.0	614.0	614.0	614.0	614.0	[illegible]	[illegible]	.0
[illegible]	[illegible]	614.	614	61	6	[illegible]		.0	.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.1	614.2
614.2	614.3	614.4	614.5	614.6	614.6	614.7	614.7	614.7	614.8
614.8	614.8	614.8	614.8	614.8	614.8	614.8	614.8	614.8	614.8

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	99.	94.	36.	18.	1778.
CMS	3.	3.	1.	1.	50.
INCHES		.32	.50	.51	.51
MM		8.23	12.67	12.96	12.96
AC-FT		47.	72.	73.	73.
THOUS CU M		58.	89.	91.	91.

MAXIMUM STORAGE = 0.

MAXIMUM STAGE IS 614.8

STATION 5, PLAN 1, RTIO 4

OUTFLOW

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	1.	1.	1.	1.	1.	1.	1.	1.	1.
1.	2.	2.	2.	2.	2.	2.	2.	2.	3.
3.	3.	3.	4.	4.	5.	6.	7.	8.	10.
12.	15.	18.	20.	24.	28.	31.	33.	34.	35.
36.	36.	37.	37.	38.	38.	39.	39.	39.	40.

STOR

0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.
0.	0.	0.	0.	0.	0.	0.	0.	0.	0.

STAGE

614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.1	614.1	614.1
614.1	614.1	614.1	614.2	614.2	614.2	614.3	614.3	614.3	614.3
614.3	614.3	614.3	614.3	614.3	614.3	614.3	614.3	614.3	614.3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40.	37.	14.	7.	711.
CMS	1.	1.	0.	0.	20.
INCHES		.13	.20	.20	.20
MM		3.24	5.03	5.18	5.18
AC-FT		18.	29.	29.	29.
THOUS CU M		23.	35.	36.	36.

MAXIMUM STORAGE = 0.

.0	.0	.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.0
614.0	614.0	614.0	614.0	614.0	614.0	614.0	614.1	614.1	614.1
614.1	614.1	614.1	614.2	614.2	614.2	614.3	614.3	614.3	614.3
614.3	614.3	614.3	614.3	614.3	614.3	614.3	614.3	614.3	614.3

	PEAK	6-HOUR	24-HOUR	72-HOUR	TOTAL VOLUME
CFS	40.	37.	14.	7.	711.
CMS	1.	1.	0.	0.	20.
INCHES		.13	.20	.20	.20
MM		3.24	5.03	5.18	5.18
AC-FT		18.	29.	29.	29.
THOUS CU M		23.	35.	36.	36.

MAXIMUM STORAGE = 0.

MAXIMUM STAGE IS 614.3

********** ********** ********** ********** **********

PEAK FLOW AND STORAGE (END OF PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND (CUBIC METERS PER SECOND)
AREA IN SQUARE MILES (SQUARE KILOMETERS)

OPERATION	STATION	AREA	PLAN	RATIOS APPLIED TO FLOWS RATIO 1 1.00	RATIO 2 .75	RATIO 3 .50	RATIO 4 .25
HYDROGRAPH AT	1	1.40	1	3752.	2814.	1876.	938.
	(	3.63)		(106.25)(	79.69)(	53.13)(	26.56)(
HYDROGRAPH AT	2	1.30	1	4287.	3215.	2143.	1072.
	(	3.37)		(121.39)(	91.04)(	60.69)(	30.35)(
2 COMBINED	3	2.70	1	7797.	5848.	3899.	1949.
	(	6.99)		(220.80)(	165.60)(	110.40)(	55.20)(
ROUTED TO	4	2.70	1	1372.	540.	99.	40.
	(	6.99)		(38.84)(	15.28)(	2.80)(	1.12)(
ROUTED TO	5	2.70	1	1371.	540.	99.	40.
	(	6.99)		(38.82)(	15.28)(	2.80)(	1.12)(

SUMMARY OF DAM SAFETY ANALYSIS

PLAN 1 ..... INITIAL VALUE SPILLWAY CREST TOP OF DAM

ELEVATION	657.00	657.00	660.00
STORAGE	1300.	1300.	3080.
OUTFLOW	0.	0.	109.

RATIO OF PMF	MAXIMUM RESERVOIR W.S.ELEV	MAXIMUM DEPTH OVER DAM	MAXIMUM STORAGE AC-FT	MAXIMUM OUTFLOW CFS	DURATION OVER TOP HOURS	TIME OF MAX OUTFLOW HOURS	TIME OF FAILURE HOURS
1.00	661.57	1.57	4101.	1372.	9.00	45.00	0.00
.75	660.74	.74	3565.	540.	8.00	47.00	0.00
.50	659.77	0.00	2942.	99.	0.00	50.00	0.00
.25	658.43	0.00	2129.	40.	0.00	50.00	0.00

PLAN 1 STATION 5

RATIO	MAXIMUM FLOW-CFS	MAXIMUM STAGE-FT	TIME HOURS
1.00	1371.	621.2	45.00
.75	540.	617.7	47.50
.50	99.	614.8	50.00
.25	40.	614.3	50.00

REFERENCES

APPENDIX E

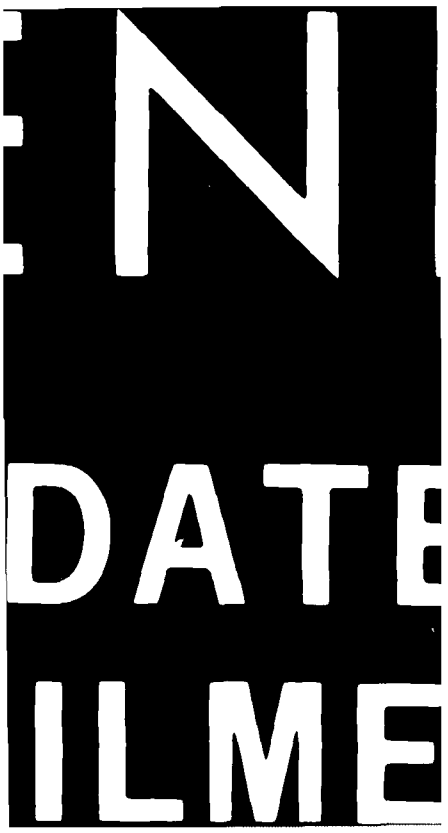
REFERENCES

1. "Flood Hydrograph Package (HEC-1) Users Manual for Dam Safety Investigations", U. S. Army Corps of Engineers, Hydrologic Engineering Center, September 1979.

2. "Seasonal Variation of the Probable Maximum Precipitation, East of the 105th Meridian for Areas from 10 to 1,000 Square Miles, and Durations of 6, 12, 24 and 48 Hours", Hydrometeorological Report No. 33. Weather Bureau, U.S. Department of Commerce, April 1956.

3. "Recommended Guidelines for Safety Inspection of Dams", Department of the Army, Office of the Chief of Engineers, Appendix B.

4. The University of the State of New York, The State Education Department State Museum and Science Service Geological Survey - MAP and Chart Serves No. 5, Geologic MAP of New York 1961, Lower Hudson Sheet.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